

A Publication of  
Grove Enterprises, Inc.

# Monitoring Times

News, Reviews  
and How-to's for  
the Radio  
Hobbyist

## LOOKING BACK

Two East European  
Broadcasters  
Gain Perspective on the Past

03

- **THE JAYHAWK**  
Coast Guard Helicopter  
Earns Its Wings
- Monitoring the Mexican Military
- **A PLACE IN HISTORY**  
The Story of Latin America's  
First Shortwave Station



03



# The Fastest Counter Starts with the Fastest Chip

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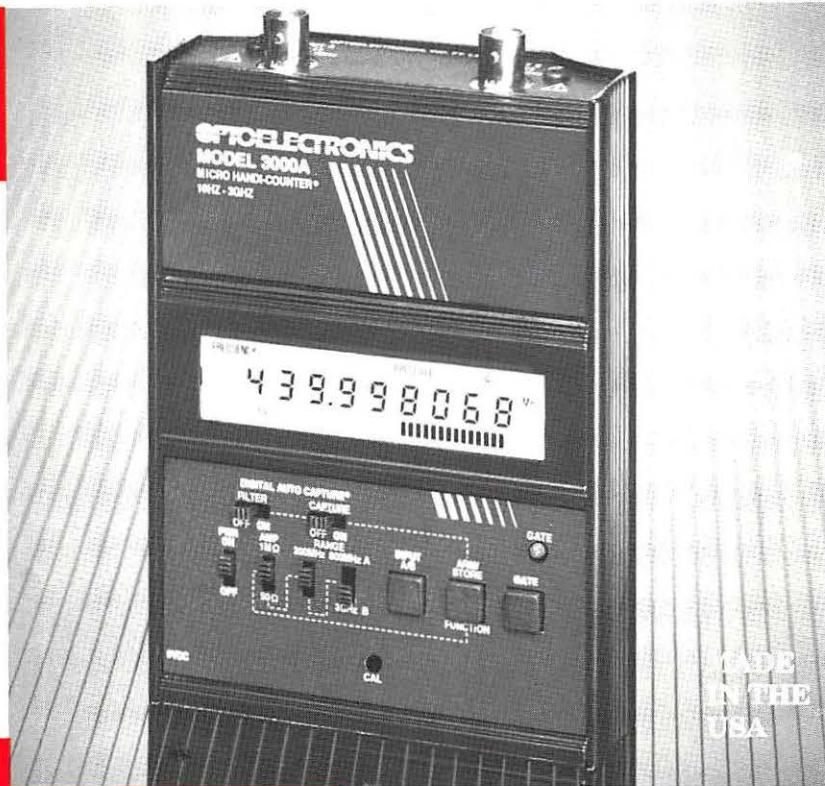
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# Monitoring Times

## *Looking Back: An Eastern European Perspective* 8

By Jeff Chanowitz

Two broadcasters—one from Romania and one from Hungary—share insights into what it has been like broadcasting from “both sides” of the Iron Curtain. Also, an American reports on his observations while teaching a broadcasting seminar in (then) Czechoslovakia.



## *The Jayhawks are Coming!*

By Bill Battles

This young upstart Coast Guard Search and Rescue helicopter may fly circles around old reliable HH-3F Pelicans, but it still needs some breaking in. In fact, the Jayhawk still needs an escort when more than 100 miles from shore. After you've tried to monitor the Jayhawk, you'll understand why.



## *The Unique Story of TI4NRH*

By Don Moore

TI4NRH has earned its place in history as Latin America's first shortwave broadcast station. But it's more than that—here is the story of an insatiably curious and hard-working Costa Rican who won the hearts of all who encountered his pioneering and peaceable spirit.

**COVER:** A cablecar offers a tourist's view of Romania. But to see the country from the perspective of a broadcaster, turn to page 8. Photo courtesy of Radio Romania.

# Monitoring the Mexican Military

By Mike Lima

22

Just like the author, you may be ignoring a wealth of intriguing communications which look like routine Spanish administrative telegrams. Well, look again; you may be tuned in to a Mexican military net and you'll be surprised how much you can understand with a little practice.

# Stranded in a Storm

By Ron Bruckman

27

Stuck in a snowdrift, the author turns to the CB he had bought for fun. Would anybody be able to hear him? Would anyone be listening?

# And Much More ...

As promised, Bob Grove spells out what the scanning hobby can expect as the FCC puts anti-scanning legislation into effect. Turn to "Closing Comments" to see how the FCC has carried the issue even further than it was mandated.

Are you well-grounded? If you're not sure, turn to the "Beginner's Corner" for an understandable explanation of the benefits of grounding and how to tell if you really are. While you're looking at antennas, maybe it's time to dispense with that random wire antenna. "DeMaw's Workbench" discusses the virtues of a multiband dipole with a balanced feeder.

Larry Magne gives a good review to Sangean's ATS 606p travel portable. It does the job it was made to do, at a reasonable price. Other reviews in this issue are the Uniden BC172XL, Connect System's CD-1 Digital Decoder, and the MFJ-204B Antenna Bridge.

For a delightful look at how country music and radio grew up together, see "American Bandscan," and have a great month of monitoring!

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# LETTERS

## Radio Psychology

The 4th Psychological Operations Group out of Fort Bragg, NC, is at it again, says Jeff Multer of Charlotte, NC. The outfit that brought Radio Recovery to the storm-shocked community of Homestead, Florida, has set up Radio Raja in Somalia. Its mission of facilitating relief communications is even more critical, given the language and cultural differences. The *Charlotte Observer* gives their intentions a more negative twist however, implying the information is skewed toward making the Somalis "more compliant."

Jeff says, "R. Raja is using the same type of 400 watt transmitter used in Florida." He also reported to the National Radio Club *DX News* that the frequency is thought to be 1480 kHz, transmitting around 12:30 and 6 pm local time. BBC monitoring also reports 9540 kHz being tested at 1130-1200 UTC.

"Just in case an *MT* reader does hear R. Raja, the Ft. Bragg address given for R. Recovery is still good": Officer in Charge, Radio Raja, c/o 22nd Military Public Affairs Detachment, Ft. Bragg, NC 28307, USA.

Jeff adds, "About two years ago, I suggested to my local magazine store to try *MT*. This year, they did. Although it seems some dealers only want to order through magazine distributors, any dealer not selling *MT* is losing sales!"

Thanks for the research and the plug, Jeff!

## Disabled DXers, Inc.

A determined group of SWLs and amateur radio operators are attempting a miracle in Phoenix, Arizona. For the past year, a plan has been coming together to purchase the house now being leased—"the only facility, living quarters, meeting place and fixed radio and ASTV base for handicapped, disabled people interested in being hams in Arizona." The total cost to purchase and remodel—\$200,000!

Bill Miller, KB7NHZ, President of the Disabled Americans in Amateur Radio (DDXer's), says, "Before the local ham people began getting me involved in the hobby, I was hiding in a corner of my house, only concerned about when I was going to receive my next pain pill. Many other disabled people are still in that 'corner' because there is no place else to go."

"When I moved into this house two years ago, I had no idea that I would rekindle my interest in amateur radio, somewhat overcome my own personal handicap, and help someone else!"

If you are interested in supporting or

joining the DDXer's, write to Bill Miller, P.O. Box 42536, Phoenix, AZ 85080-2536; (602) 375-9801.

## Taking a Stand

*Monitoring Times* columnist Larry Magne is not afraid to take a stand, as readers well know and generally respect—except when it involves a favorite cause.

From Elaine Payne of Bessemer City, NC: "I own an American Electrola from For the People and enjoy it very much. Chuck Harder never said buying foreign-made goods was economic treason; he says that shipping factories and jobs overseas was economic treason. I would appreciate seeing him quoted accurately."

From John Nelson, Cleburne, Texas: "I must take exception to Mr. Magne's review (in Jan 93 issue) of the DXC-100 'Portatop' radio. Mr. Magne should be aware of the facts before he starts throwing spitballs. I cannot believe he has listened to a full For the People program, and I know he cannot have seen the DXC-100 radio. Yet he is able to spout nonsense about Chinese made products and the performance of a radio that is not on the market...*MT* has provided me with lots of information and product guidance, but I think this is way off base."

Magne's comments (not a review) were based upon the specifications announced by For the People, and he calls the Portatop an "interesting new model" which he looks forward to reviewing. He "gave good marks to a cheap portable"—their Portex—in an earlier review.

I believe no one would be more delighted to see a moderately-priced, quality American-made world band receiver than Larry Magne. But, given the obstacles stacked against an American company in such a competitive field, one can't blame him for being dubious. Grove's cancellation this month of their long-expected SW-100 receiver is a case in point.

On the positive side, reader Thomas Wood of Arlington, VA, writes, "Thanks to Larry Magne for the review of the Lowe HF-150. I was one of those who followed Larry's advice, 'Why resist?' I'm glad I acted, too!"

## Grand Old Receiver

While on the subject of receivers, the Zenith Transoceanic mentioned in the January issue elicited a number of reminiscences. Bill James-Wooley of Philadelphia, PA, and Frank Reisch of Rockwall, TX, both admitted it had been their greatest desire as a kid to own one, but they never did. James Snow of Murray, KY, was one of the lucky ones. So was D.S. McCormick of Spring Lake, NC, who relied on it while overseas.

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Mark Henning of Hamburg, NY, owns a Transoceanic Royal R-7000-Y from 1972. "It's been aligned, maligned, dropped and once went through delicate surgery to find a bad solder joint."

Mark tells this story: "The radio was first purchased by *MT* subscriber John Butler of Novato, California. But after some trading, I ended up with this little jewel. We were stationed with the US Army in Turkey."

"While in Turkey, John and I once 'stole' several hundred feet of copperweld wire fence from an abandoned Air Force building to make antennas. As it turned out, we had to 'steal' some more because the CO wanted an antenna, too! We ended up with three 100' wires on the barracks. Nightly DXing and competition to be the first to hear a Stateside AM station were the rule for several months. There will never be another time like then nor another radio like the Transoceanic."

"It has kept me interested in radio as a hobby... As a matter of fact, almost two years ago radio reunited me with John. I had written to *Monitoring Times*, and when he saw my name printed in the 'Letters to the Editor' column, he gave me a call. After 18 years we've been reunited as 'old Army buddies,' radio nuts and friends. Just like the old Zenith."

## Global Positioning

Readers who called the phone number provided in our January feature for *GPS World* magazine have found that no one answers. Here is the new address/phone to call or write for a subscription: 1-800-949-6525 (or 503-343-1200 x114 if outside the US); P.O. Box 7677, Riverton, NJ 08077-7677. Also, I'm sure most readers noted the switched photos/captions for the Motorola Traxar and the Garmin GPS 50.

Several readers expressed appreciation for the introductory GPS article. We also received some excellent information on GPS from Richard Langley, an engineering professor at the University of New Brunswick, Canada. Here's part of what he provided:

—Each satellite transmits two unique pseudorandom noise code sequences: a short C/A or clear/access code, which is repeated every millisecond, and the very much longer P or precision code which is repeated after seven days. Most civilian GPS receivers only access the C/A code.

—The accuracy afforded to civilian users has been purposely degraded by DoD. GPS horizontal position accuracy for "unauthorized" users means that, in practice, the true position will usually lie somewhere within 100 meters. However, higher accuracies can be achieved by civilians using differential GPS (DGPS).

—As of 5 January 1993, 21 GPS satellites are available for use.

## Subscription Sponsorships

Would you like to help someone receive *Monitoring Times* who cannot afford the cost of a subscription? From time to time we receive letters from persons to whom radio means a window on the world—whether that world is global or local—but who can't afford, due to varying circumstances, to subscribe to their favorite hobby magazine.

Whenever we become aware of such persons, we will list them by their state (or country), to protect their anonymity. Let us know if you would like to help, but send no money until we send you the name of the person you will sponsor. Your gift will be anonymous, but should you wish to contact the person you are sponsoring, you will have their name and address.

We have the name of one person to begin the program: MR. NEW YORK. Go ahead; make his day!

—The time signal stations WWV and WWVH transmit brief reports on the status of the Navstar Global Positioning System, prepared by the USCG's Omega Navigation Systems Center in Alexandria, VA. The broadcast from WWV is at 15 minutes past the hour, with a brief description in the preceding minute. WWVH broadcasts the report at 44 minutes past the hour.

If you'd like to know more, Richard recommends the *Guide to GPS Positioning*, published by Canadian GPS Associates. Cost is about \$35 plus s/h. Order from the publisher, or enquire about a dealer in your area: Canadian GPS Associates, P.O. Box 3184, Postal Station B, Fredericton, NB, Canada E3A 5G9, Ph (506)450-1787, Fax (506)454-0352.

## Short Subjects

• From Patrick Martin, Seaside, OR: "I took an interest in the article on Radio Kiribati in December *MT* because the station is one of the regular MW stations I hear! I am wondering why the 10 kW station was not mentioned. I have never caught their SW transmission, though I haven't tried much."

"Living on the Northern Oregon coast about a mile from the Pacific Ocean, many MW signals are heard from the Pacific. Many of the Hawaiian signals are like locals at night, especially the ones from "The Big Island," at Hilo. Tonga is heard on 1017, Samoa on 540 and 747 kHz, Solomons on 945 and 2035 kHz, and Kiribati on 846 kHz. Their 10 kW is one of the better signals most nights after 0700 UTC."

"The Drake R8 is a great MW radio along with the Grove TUN4. I use a terminated 200' longwire running Southwest, a 1500' Eastern

Beverage running due East and a 1600' NNW Beverage aimed at Alaska."

• From Edward Robinovitz, Pennsauken, NJ: "I listen to people speculating about the demise of shortwave radio with the growth of the satellite transmissions. My Drake R-8 may be an expensive toy, but the thought that everyone who wishes international information unfiltered by their own government has to be set up with a satellite reception system is totally unrealistic."

"I am also using an old Zenith Transoceanic [Aha; another convert!] for which I paid \$25 many years ago. In Germany during my activation for Desert Storm I found that the only way to get some idea of what was really going on was to listen to the international broadcasts. After that, I was addicted to getting all sides of the stories. I wish I had a shortwave guide then. Please make a stronger effort in keeping your listing up to date."

• From Janet Haseley, Grifton, NC: "Some of your readers interested in the NASA SETI project, might like to know of an upcoming seminar that will deal with this subject [Extra-Terrestrial Intelligence] in a very interactive way: The Asimov Seminar at The Rensselaerville Institute (Rensselaerville, NY) August 7-11, 1993. These seminars were begun 20 years ago by the late Isaac Asimov who personally led them until his health began to fail. Noted science fiction writer Ben Bova will lead the 1993 Seminar which will deal with the subject of the social, cultural and technological impact on humanity once contact has been established with extra-terrestrial intelligence."

Those wishing specific details about the seminar may call Don McGrain (609-629-3732), one of the Steering Committee members.

• From Mick Wells, Xenia, OH: "I'm trying to locate anyone who's heard or monitored the shortwave broadcasts of the DX Radio Network, headquartered in Rochester, NY."

Good question, Mick; DX Radio Network acts as a kind of broker or placement service for anyone with programming—usually religious—they want to broadcast on shortwave. The answer to the question you ask—has anyone actually heard one?—may never be known. Can anyone testify as to this service?

That's all the room we have this month for your good letters and comments. Edward, I hope you and our other shortwave broadcast listeners will be pleased with the changes we've made in the past two months in the English Language Shortwave Guide. All stations are now listed by country, and are sorted by start time only. We hope you will find the Guide more accurate and much easier to use. After all, our reason for being is to add to your radio enjoyment; let the good monitoring times roll on...!"

Rachel Baughn,  
Editor

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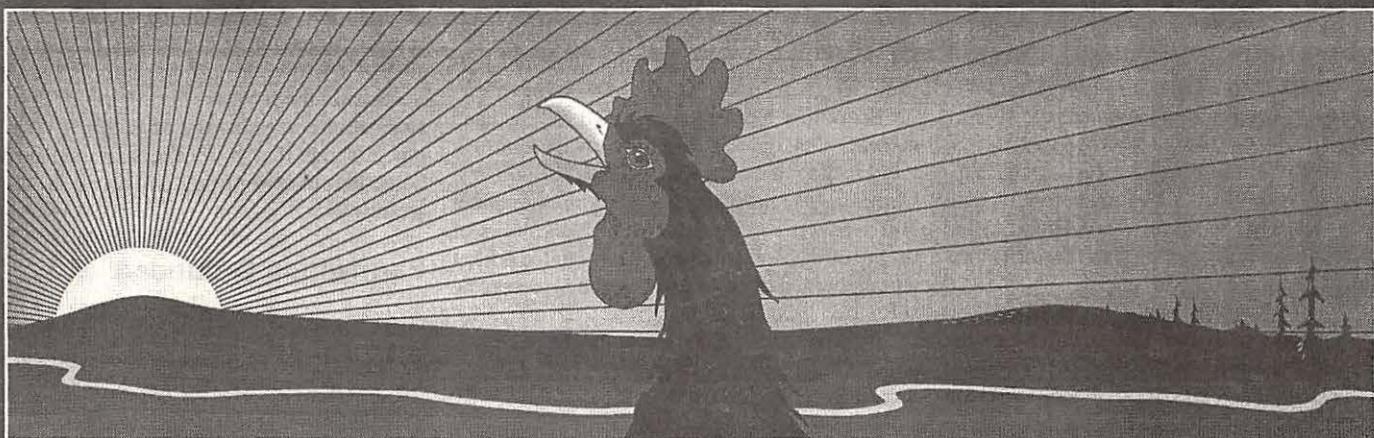
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# COMMUNICATIONS



## Grove Pulls Plug on SW-100

Progress on the long-awaited Grove SW-100 receiver has been stopped due to continued delays and soaring development costs. Bob Grove, who originally conceived the receiver many years ago, admitted that by the time the SW-100 would finally make the marketplace, investment costs could not be recouped.

"We have learned a bitter lesson about using outside consultants," continued Grove. "As long as the customer can pay, there is no incentive to conclude the project. We have spent about half a million dollars over the past five years on this receiver with no end in sight for the foreseeable future. I think the hardest lesson I learned was that integrity does not seem to be a ready commodity in the consultant business."

Has the experience caused Grove to pull away from new product development? "I just had a half-day conference with my production people and we have agreed to start immediate work on several new products which will be developed in house." Concluded Grove, "Life goes on."

## Ham Hero

"I wouldn't describe it as the sort of thing that happens every day," says Coast Guard spokesman Brice Kenny of the amazing rescue coordinated by a midwest ham radio operator.

The story goes like this: Wilber Warke, a retired Air Force radio technician, was killing time, playing with his ham radio before he had to go to work. Spinning his way across the dial, Warke suddenly stopped. "I heard this English accent voice come over and say he had an emergency and did anybody copy."

Warke kept the channel open and called Scott Air Force Base where officials tried but failed to establish contact with the sinking vessel. Warke then contacted the Coast Guard, which determined that a Norwegian tanker was only 22 miles from the coordinates Warke relayed.

"I was amazed at how fast things happened. In less than two hours, before I had to leave for work at 4, the Coast Guard called to tell me that the Norwegian tanker had the sloop in sight."

"I appreciate the accuracy and speed and the professionalism of Mr. Warke," said the Coast Guard's Kenny. "That speaks highly of his training in the U.S. Air Force and as a ham radio operator."

## Lawsuit: Killer Cellphone

Microwave radiation from a cellular telephone contributed to the brain cancer that killed a woman, her husband charges in a lawsuit. David Reynard believes his wife, Susan, 33, died May 24 as a result of her use of a portable telephone he gave her to "make her life easier" during her pregnancy.

According to UPI, the suit, filed against NEC America, the phone's maker, alleges that the tumor grew to fatal proportions because the telephone "was so equipped with an antenna so positioned as to cause exposure to microwave radiation in an excessive amount to the portion of the brain where the tumor was found."

Dr. Louis Slesin, publisher of *Microwave News*, said: "You're putting something that can reach miles away just centimeters from your eyes and from your brain. Is it possible that it has some deleterious effect? Of course it's possible."

Andrea Palazzolo, NEC's lawyer, said that the case was "without merit" but others disagree. There have been increasing calls for new scientific studies and reevaluations of the 8-10,000 already on record. Two cellular phone users in Chicago have filed a class action suit against Motorola, Inc. and Mitsubishi Electronic Corp., charging the companies marketed the phones without first establishing the safety of the radio waves they emit. *Monitoring Times* will keep you posted as the games begin.

## Ugly Americans: Electronic Temptation

One hundred and twenty-six members of Texas Southern University's "Ocean of Soul" marching band were recently in Japan to play during a football game. Afterwards, the whole group was taken to Akihabara, an area known for its electronic shops.

All went well until store employees saw some band members stealing products and gave chase. The Americans fled to their waiting buses. But police were unable to identify the thieves because everyone was wearing identical uniforms.

So police blockaded the bus, telling band members that unless the products were returned, they would not be allowed to leave the country. Quoting Associated Press, "One by one, about 100 products were passed to the back doors of the buses. The returned products included pocket tape recorders, pocket televisions and video game software..."

In all, some \$22,000 worth of electronics was stolen. TSU disbanded the Ocean of Soul upon its return to the States.

## You Can't Trust Anyone

Radio station WMBO-AM in Auburn, New York, was fined \$5,000 by the FCC. The fine was in response to two rules violations: the oldies station failed to have a licensed operator on duty and the station was found guilty of misleading the public by playing promos saying that the staff was "working on the following stories" when the newscasts were, in fact taped.

How did the FCC come to find out about these noxious violations? According to local newspaper reports, the complaint was filed by John Lander, an inmate serving an 18 month sentence for attempted murder.

According to Cook, Landers was angry at the station for not reporting his news tips about the Auburn Correctional Facility. "He was upset...so he instigated."

## A Qualified "Thanks" From the Law

Police arrested two men after a scanner listener, who was listening to cellular phones, called in a tip.

The unidentified radio hobbyist reportedly heard the two making plans for a drug deal in Los Angeles, copied down the important information, which included the time and location of the deal, and reported it to police. A little more than a half hour after the police received the tip, they witnessed an apparent drug transaction, stopped the men and found about a half pound of marijuana.

Police do not know the name of the tipster, said police Lt. Bob Burnett, adding that it is a federal offense to monitor cellular phone calls.

## New Scanner Law

Politicians in Massachusetts have introduced legislation (HB 129) that would "criminalize the possession of a device capable of intercepting law enforcement radio transmissions during the attempt or commission of a felony or misdemeanor."

Should the law pass during the 1993 session of the legislature, *Monitoring Times* recommends that you leave your scanner at home before committing any crime in Massachusetts.

## Earthwinds Grounded

Following reports to *Monitoring Times* of an increase in communications activity as systems were tested, the *Earthwinds Hilton* balloon attempted a liftoff at sunrise, January

# COMMUNICATIONS

12th, for its historic around-the-world flight. Its objective was to rise 35,000 feet where it would catch the tradewinds and circumnavigate the earth at speeds of 100-150 mph.

Apparently, the almost unattainable windless conditions were again illusive, as the rising balloon was carried toward the neighboring mountain range. When the bottom balloon grazed the ridge, both balloons were destroyed in the ensuing crash, although there was minimal damage to the fiberglass gondola. No more ascensions will be possible this season.

Prior to the flight, communications were heard by Dave Walker, of Durham, Ontario, from *Earthwinds* to Operations via FleetSatcom on 262.075. Both sides were audible. *Earthwinds* planned to use 28303 kHz SSB as a voice beacon during the flight. *W5YI* reported that periodic broadcasts were also planned on 3347, 13993, 14663 and 20994 kHz (MARS frequencies).

Will they try a third time? Pilot Larry Newman is not one to give up, but extensive commercial backing is required for what has turned out to be a very expensive project.

## Big Shot

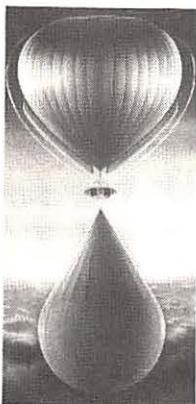
Life is different in Italy. While people in the U.S. settle down after dinner to watch Pat Sajak spin the "Wheel of Fortune," viewers in Italy watch *Colpo Grosso* ("Big Shot"). Like *Wheel of Fortune*, the show has a male host, but beyond that, there are few similarities.

In *Colpo Grosso*, contestants play poker—strip poker—in front of a nationwide audience. According to reports, most are willing to strip down to nothing more than a G-string (there is some modesty) for the equivalent of about 200 U.S. dollars.

But Italian TV, which has long had a reputation for being "racy," is now getting some resistance. For the first time in history, a group has organized a letter writing campaign against what they call "trash TV." The goal of the protest is 50,000 letters.

## Probably Not *Colpo Grosso* Fans

Moslem militants armed with sledgehammers went to work on a number of television



relays, satellite dishes and electrical substations in Turkey. According to the Reuters news agency, the campaign was designed to disrupt television programming which the militants claim is Christian- and Western-inspired.

Posters appearing at Ankara University said such programming was especially inappropriate at a time when Bosnian Moslems were being killed by Serbs in the former Yugoslavia. Five suspects were detained for questioning.

## Everyone a Broadcaster

Saying that "We can allow every Cuban-American to become their own broadcasters," U.S. Representative Robert Torricelli (D-NJ) has drafted a bill that would reserve a portion of the shortwave band for two-way communications with Cuba.

Telephone calls have always been difficult between Cuba and the nearly 1 million Cuban exiles in south Florida. One aging undersea cable handles virtually all traffic and Cuba recently accused the United States of blocking normal telephone links and demanding that the U.S. pay \$80 million it claims it is owed in unpaid telephone fees. Rep. Torricelli did not specify what frequencies he had hoped to reserve.

Curiously, AT&T has just announced that it has activated an undersea fiber optic system for Puerto Rico, St. Thomas and Tortola. It is reported that TAINO-CARIB is part of a larger Caribbean undersea cable network that will connect all of the U.S., Latin America and Europe by 1994.

## Warning! Intruders!

In a very short blurb titled, "Spanish Language Intruders!" the *W5YI Report* states that "Illegal voice operations on the low end of 10-meters (between 28.000 and 28.100 MHz) continues to be a problem." Give a listen.

"Communications" is written by Larry Miller from a variety of sources, including material submitted by the following readers: Dave Alpert, New York; Joe Brown, Massachusetts; David Bogart, Texas; Ronnie Bratton, Virginia; Glenn Carella, New York; Fred Chesson, Connecticut; Ralph Craib, Karl Dahlquist, California; Dennis Drissi, California; Dave Garner, Patrick Lacey, Arizona; Loy Lee, Kentucky; Gordon Levine, California; Ken Mason, Washington, D.C.; Jeff McDonald, New Hampshire; David Mc Avoy, South Carolina; Ricardo Molinar, New Jersey; Howard Mortimer, New York; Jeff Multer, North Carolina; Chuck Robertson, Illinois; Bob Thompson, Florida; The BBC Monitoring Service, *National Scanning Report*, and the *W5YI Report*.

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# Looking Back

## Eastern Europeans Gain Perspective on the Past

By Jeff Chanowitz

**D**uring the cold war, many "iron curtain" services proliferated throughout the shortwave spectrum. With considerable financial backing from their respective governments, broadcasters such as Radio Berlin International, Radio Bucharest and Radio Prague provided programming ranging from outright propaganda to unique specialty features.

Nearly four years after the end of communism in Eastern Europe, these broadcasters have been dramatically transformed. *MT* talked with representatives from Radio Romania International and Radio Budapest to ask the question long on our minds: What is it like to have been a broadcaster under such divergent circumstances?



### Romania

#### Radio Bucharest: The Communist Era

Being the chief of the English service and having worked during the Cold War

days as well as under the new style of programming, Fredrica Dochinoiu has a unique insight into the changes that have occurred within the Romanian external service. When she joined the service in 1965, Dochinoiu's background was largely in speaking and teaching English, with little knowledge of journalism. She explained, "The most important thing at that time was to be able to read English well and be able to translate quickly."

Radio Bucharest, as the service was known during the communist period, served largely as a propaganda tool of the government. Dochinoiu described the service's role as "making Romania known to the world...This policy was then expanded to making the policy of the Romanian Communist Party known." Dochinoiu described the first half of each Radio Bucharest broadcast as "sheer propaganda," with cultural, musical and youth features in the second half hour.

In addition to propaganda, the service's programming was also censored to ensure it was consistent with the communist party's dictates. Dochinoiu, whose job consisted of answering listener's letters and conducting interviews with foreigners visiting Romania, remarked, "If I went to do an interview with an American and they would say something not very commendable



*Ceausescu quoted an old Romanian saying, "When the poplar tree grows pears, then will capitalism come back to Romania and oust communism." Hammer and sickle no longer grace this Romanian flag.*

about the system or Ceausescu, it was cut out of the interview and not kept in the broadcast."

During the 1970s, Romania's communist dictatorship was transformed into a Stalinist personality cult centered around Nicolae Ceausescu, resulting in greatly increased censorship at Radio Bucharest. Dochinoiu recalled, "If a person asked about railways and the censors thought the figures were not up to international

standards or gave Romania a bad image, they were not mentioned." The censorship got to the point where, during the 1980s, "I was not allowed to write the power of our transmitters in a letter." Dochinoiu added, "This was unbelievable to me since that information was listed in the *World Radio and TV Handbook* at that time."

In 1968, Radio Bucharest started its *Listener's Club*, which continues to provide diplomas and

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### The December 1989 Revolution

Yet, the incessant propaganda broadcast by Ceausescu on the domestic and international Romanian media could not fool the country's impoverished people, who were fed up with the rationing of food and electricity, along with brutal repression from the hated secret police. On December 21, 1989, the massacre of protesters in the provincial town of Timisoara—which the population knew about because of widely heard BBC broadcasts—resulted in Ceausescu being booed on live TV while giving a speech. During the turmoil of the resulting revolution, Radio Bucharest played a role in informing the international community about the changing situation within the country.

On December 22, after hearing about the shooting of student protesters in the center of Bucharest, Dochinoiu was surprised by signs in the streets put up by students stating "Down with Ceausescu." While she was waiting in line for bread before going to work, a woman came running, screaming with joy that "he had left"—meaning that Ceausescu was gone. Dochinoiu immediately rushed to the station. Reflecting on her emotions at the time, Dochinoiu remarked, "I was at a loss because I did not know what to do."

Because staff members thought that the secret police had probably cut the line to the stations transmitters anyway, it was decided that all news and programming would be replaced with Romanian folk music. The shortwave service's studios were located in the same building as the domestic radio, and crowds gathered outside the building demanding that communiques be read denouncing the regime. A few tense moments erupted outside when the crowd thought people inside the radio building

supported the regime. A staff member defused the situation when he waved a Romanian flag out of the building with its communist emblem—the hammer and sickle—cut out of it and announced, "We are on your side!" The crowd was then let into the radio studios and ordinary people were put on the air and allowed—for the first time—to state their true feelings about the communist regime.

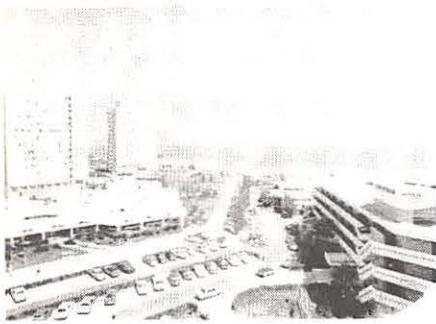
At 4:30 am on the 24th, shooting was heard in the street in front of the radio station, and an official announcement was made by the National Salvation Front—Romania's new government—that Ceausescu had fled the capital by helicopter. Radio Bucharest then started around the clock emergency broadcasts in the five major languages—German, Spanish, Russian, English and French—for the next several days. Dochinoiu described this time as an "exciting and hectic period...because the revolution was so sudden, but everybody wished it."

Also, around this time, members of the staff went on the air, each making his or her own apology about the lies that had been broadcast to listeners for the last 30 years. Dochinoiu stated on the air, "...that though we had to say those propaganda things about Romania, we were not spoiled in our thinking about what was right and wrong."

Reflecting on the level of blame she shares for broadcasting the former regime's propaganda, Dochinoiu remarked, "I don't feel responsible because I couldn't do anything else if I wanted to keep my job." Yet, she also recalls having an emotional conversation with her son on the same subject in early 1989. Dochinoiu's son asked her, "Why are you not doing anything? You could go on the radio and tell the truth about Romania!" She replied, "Are you sure you want to do without me? Because if I say anything, I will go to prison...that is quite clear!"

### Radio Romania Today

After the revolution, many old staff members were asked to leave and



seven new announcers were added. In addition, the station changed its name to Radio Romania International.

Yet, with no law covering Radio Romania International's status, its existence was left in limbo. Dochinoiu remarked, "The parliament passed a law changing our status from government run to a public service, so our financial situation is now worse." While the mailing of QSLs has not yet been affected, budget problems have resulted in journalists answering listener's letters, which is slowing outgoing replies greatly. (The service appreciates listeners mailing IRCs or cash to help the station buy postage stamps.)

In early 1992, a crisis erupted, as the post office, which owns the antennas and transmitters of Romanian Radio and TV, raised its rental rates to a level which the service could not pay. Only an act of parliament, that granted funds for the service and placed operations under its jurisdiction, saved Radio Romania International from going off the air.

In spite of financial problems, Radio Romania International's output continues to increase. The newly revamped service has added Macedonian-Romanian (a Romanian dialect spoken in areas of former Yugoslavia), to the other 13 languages the service broadcasts. Additionally, Romania now provides more programming aimed at specific regions of the world.

Says Dochinoiu, "We kept some of our cultural programs and added many new ones. In addition to *Cultural Artistic Notebook*, *Through Bucharest along the Centuries*, and *Cultural Affairs*, the service has added new features such as *Investments In Romania* and *Economic Agenda*, which update listeners with the latest business news in the country.

While the economic changes are covered extensively, the service has also set out to provide coverage of the many new political parties and exhibitions happening throughout the country. Dochinoiu commented, "Before, our cultural ties were nothing; now they are booming...Everything in Romania is booming today."

To obtain more information on or about the new programming or the listener's club, write to: Radio Romania International, P.O. Box 111, Bucharest, Romania.

Reflecting on her goals for the English language service, Dochinoiu commented that she is trying to provide programming that is "more

lively" and less "a numeration of facts." Additionally, she also hopes to provide, as much as possible, "diverse viewpoints" from all perspectives of Romanian society. Yet, Vasile Ionescu, the deputy director of the service, put the dramatic changes at Radio Romania International in a nutshell when he stated, "Finally, the Romanian service is in the hands of professionals, not party activists."



## Hungary

### Radio Budapest

While many Eastern European services changed only after their country's revolution in the late 1980s, Radio Budapest pioneered its open and listener friendly style in the 1960's. This progressive style was the result of the efforts of Charles Taylor Coutts. After working in Hungarian radio for a while and then returning to his native Scotland, Coutts was asked to head Radio Budapest's English language service in 1964.

Coutts stated, "I agreed on the condition that they would allow me to lift out of the cold war style of programming...In other words, 'we are right and you are wrong' which was the style of both sides at that time." Coutts added, "Largely because I was a foreigner and because the situation was changing—as Hungary was moving toward a market economy at that time—I got away with it."

Despite some governmental resistance, Coutts continued on his goal of "introducing as objective as possible newscasts" to "show to American and English speaking listeners that despite the dictatorship and the totalitarianism, there were real live issues in Hungary that could engage people." Coutts compared Radio Budapest's broadcasts at that time to a "local radio station in Britain or in the United States, giving a day by day picture of what is happening in Hungary!"

Ironically, some of the strongest resistance to changes at the station came from Radio Budapest's listeners, who were quite left-wing on the political spectrum. Many of these listeners wrote in complaining that the service was no longer "revolutionary enough." Coutts commented, "While we lost some of the old type of listeners, we gradually built up a new type of audience between 15 and 35...interested, curious and argumentative, who took issue with us, and this is what we were looking for!"

For this type of listener, Coutts developed a number of programs centered around issues, such as abortion rights, religious freedom, consumer choice, and nuclear disarmament. To receive audience input, the service invited listeners to write to or send an audio tape to the station containing their opinions about certain topics

discussed on Radio Budapest. In turn, Radio Budapest promised that all responses sent in would be aired without any editing. Commenting on the political implications of the programming, Coutts stated, "It was a big risk that we took at the time—airing listener's opinions."

Coutts' risk paid off enormously, with a dramatic increase in listener response. The station received many letters ranging from famous scholars like John Kenneth Galbraith to Nobel Prize winning scientists, along with the average listener. Unusual responses included one listener in the United States, who was a professor at a university in Michigan. The listener wrote in response to a series of programs about Hungary's style of economy that "Hungary does not have socialism, but a form of capitalism."

Yet, Radio Budapest's freedom did have limits, as was the case when Mary Caldor, a well known human rights activist in Great Britain, commented that the "nuclear divide could not be overcome unless there were full human rights and civil rights in Hungary." Before the program aired, high-level government officials censored the program.

In spite of a few setbacks, the style of the English service increasingly served as a catalyst that transformed the style of all language services at Radio Budapest. So progressive was Radio Budapest's style that, by the late 1980's, the international service was ahead of Hungary's domestic media in presenting critical voices about society and the government.

## Greater Freedom and Problems after Communism

By late 1989, Janos Kadar, Hungary's communist leader since the 1956 revolution, was replaced and a new roundtable agreement was signed between the opposition and the government, which resulted in the establishment of a democratic republic. In 1990, the roundtable agreement, which did not contain a new media law, served to jeopardize the existence of Radio Budapest by making the external service's legal status in Hungarian society very uncertain. Coutts commented, "Some members of the opposition thought that the shortwave service was a waste of time and served no purpose." He added, "They succeeded in closing down several language sections."

Before more damage could be done, the foreign ministry stepped in to save the service. Contrary to the trend of most shortwave broadcasters, the cutbacks came in the face of *increased* funding for Radio Budapest. "The cutbacks were never a question of money...The budget is bigger now than under communism." Coutts added, "That is why I think they will be restored in the long run."

Today, with all content related restrictions lifted on the service, Radio Budapest has a new role. Coutts explained, "Our job is to bring to people information about life in Hungary with sympathy, but with warts and all." In fact, he added, "We make a point of covering controversial issues."

On Radio Budapest's English broadcasts, issues—ranging from racism against Gypsies and Jews to the economic problems that are plaguing this new capitalist country—are covered on a regular basis. Even on its travel magazine, *If You Come to Hungary*, usually used as a tool to promote tourism on other services, listeners can hear critical voices, such as the negative experiences of one Austrian, who had a terrible time while visiting Hungary.

## New Programming

In addition to news updates, Radio Budapest's hour-long broadcasts include a variety of new features that cover the fast changing situation in the country. *The Weeklies* provides a review of the stories covered by the Hungarian press, *Magazine 90* allows 90 second music requests, *Business Partner* updates the changing business world of Hungary's economy. *What You Say* gives listeners a chance to voice their opinions about different subjects on the air, and *Across Party Lines* presents controversial issues in Hungarian political life.

Started by the late Dennis Herner over two decades ago, *DX Corner* continues to answer questions, provide listeners with the latest shortwave news and DX reports, and runs a yearly DX competition. To obtain further information about programming, times and broadcast frequencies, write to: Radio Budapest, Brody Sandor utca 5-7, 1800-H, Budapest, Hungary.

For those who are not satisfied with just listening to what is going on in Hungary, but want to experience the sights and sounds of the country, Radio Budapest runs an annual contest in which a free trip to Hungary is awarded. Last year's contest featured a "Care for the Environment Competition," in which listeners were asked nine of the "most encouraging ways" in which Hungary is caring for the environment. It was somewhat ironic, considering the tensions caused by forty years of Russian troops being stationed in the country, that a Russian listener won the contest. A new contest should now be underway.

The new changes in Hungary have also resulted in changes to its 14-member English department at Radio Budapest. For the first time the station has an Australian staff member and many American freelancers are now contributing

announcers at Radio Budapest. Also, despite its emphasis on listener input through the years, Radio Budapest has never had an audience research department and is just now in the process of organizing one.

Once established, the new audience research department will help speed answers to the 8,000 letters the English department receives annually (most are from the United States, Canada and the U.K.). These letters provide the service with a better profile of its listeners and improve distribution of its bi-monthly magazine *Budapest International*. Coutts also announced Radio Budapest is planning to be one of the first ex-Soviet Bloc stations to go on satellite via Astro 1B and Eurosat. However, as of yet, no date has been set for the launching of the service.

## The Future

Looking back on Radio Budapest's period under communism, Coutts remarked, "I only regret that we could not go further than we did with our programming." With a great transition taking place in the economic and political life of the country, Coutts and many Hungarians are excited about the dramatic changes. Coutts commented, "Hungary is a fantastic place to cover today...Today, we are trying to show the reality of democratic Hungary, how it emerged, where it is and where it may go." He added happily, "No longer are we trying to convert people around to any point of view."

The changes experienced by Eastern European broadcasters have been as sudden and dramatic as the revolutions that caused them, yet this new era of broadcasting is welcomed with anticipation. Without the drawbacks of heavy propaganda, listeners can now enjoy unique national perspectives and programming, along with the latest developments from this evolving part of the globe.

M

*Table of Contents photo: Radio Romania staff front row l-r: Dorina Miron, Aurora Barta, Ionana Masariu; Back row l-r: Diana Lesanu, Fredrica Dochinoiu, Euregenia Chira, Alexandru Grigorescu, and Dan Balamat.*



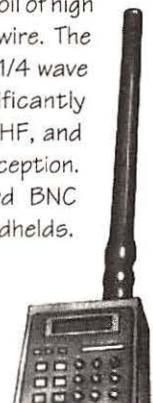
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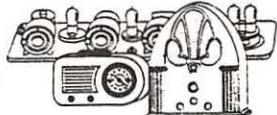
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# Broadcasters Get a Hand from the West

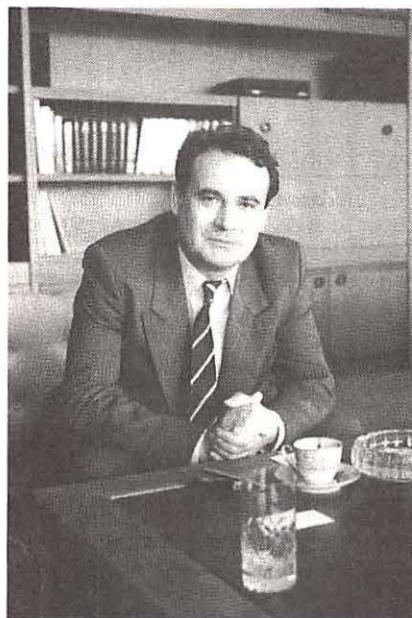
By Don Watson

With the ensuing political upheavals, broadcasters in Eastern Europe have had more to contend with than just overcoming past history. In 1990, the U.S. Congress established the International Media Fund to assist the fledgling Eastern European countries in organizing a free and independent press and broadcast service.

Before Czechoslovakia became Slovakia and the Czech Republic, Don Watson was part of an IMF project that took on a human face.

I was invited in the spring of 1991 to join a group of broadcasters traveling to Czechoslovakia. For one week we talked to students at a local university about technical matters, sales, management, programming, promotion and my specialty—news. We found our students literally hungry for the information we shared with them.

One of my "students" was actually the professor of radio broadcasting and he was eager to show me the textbook from which he taught his students. It was the standard *Broadcasting in America* which has been used in U.S. colleges and universities for many years. As a matter of fact, I had brought along my copy of the same text. The only difference was that my copy was the 7th edition and his was the 1st edition published in 1957. When I left my copy of the text at the university, I was told it was "worth more than gold."



Dr. Vladimir Stetko, Technical Director of Slovak Radio.

Four members of the I.M.F. team in downtown Bratislava. Left to right: Vesta Brandt, Jim Staginot, Gene Mater, and Bob Dunphy.



A television reporter from my class was able to set up an interview for me with the Director of Slovak Radio, Dr. Vladimir Steffko. We met at his office in the Slovak Radio building which looks like an inverted pyramid—a surprisingly modern building in a city that offers row after row of drab and predictable office and apartment buildings.

Although he had recently been appointed Director of the Slovak radio, Dr. Steffko was moving to make it an independent broadcast source. But, he said, "That is going to be very difficult, because since 1948 there has been no independent radio in the country and it's a question of reinventing the wheel—a slow process at best."

One of the biggest problems facing Slovak Radio is how to pay the bills. The State Government had previously footed all the bills but now only 20% of the operating budget will be paid for from government funding. It's a major headache for any company president or CEO to deal with and it's the lesson that Eastern European broadcasters must learn if they are going to move into advertiser sponsored programming along with a free market economy.

But Slovak radio is moving forward, as we found out during a personalized tour of the facility. Studios are first class, equipment is the best that could be found in the U.S. or Europe and the popular music is just the same that you hear on any popular music station in Europe or the U.S.

Western European broadcasters have been quick to realize the financial opportunities in the seven Eastern Countries. French, British, German and Italian broadcasters have already formed cooperative arrangements with their Czech and Slovak counterparts.

During our week in Prague, I met Karel Bartak who was spending 18 hour days creating the first all news and talk radio station on the air in Czechoslovakia. Because of the significant

cost of producing all-news radio, the Czechs have created a working agreement with Radio France International to broadcast the all-news programming from Paris several hours each day in Prague. What's in it for the Europeans? The answer is a new market for Western European advertisers. The Czechs get equipment, studios and programming while they give up several minutes of air time each hour for commercials.



The biggest problem Bartak was having was in finding reporters who could produce objectively written news copy. The radio reporters who were applying for the available news anchor jobs had been working at the State Radio for too long. They could only create copy the way they had learned under the old regime. In other words—nothing that was critical of the government or politicians would ever wind up in print or on the air.

The good news, though, is that people like Karel Bartak in Prague and Dr. Vladimir Steffko in Bratislava are working to create something that we take for granted: Independent radio and a free press. The obvious question is—will it all work? It's a tough call, but everyone I talked with there hopes so. They've had a taste of a much different kind of broadcasting during the past year or so; they like it and they want to hear a lot more.

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# The Jayhawks Are Coming!

*New US Coast Guard Rescue Helicopters*

By Bill Battles

**On May 1, 1992, the first of four new helicopters began arriving at the Cape Cod, Massachusetts, Coast Guard Air Station (AIRSTA).**

Called "Jayhawks," these new helos will replace the HH-3F "Pelican" model which has served for the past 20 years at the larger air stations. Classed as a "Medium Range" model, the plan is for 32 of them to be delivered to various AIRSTAs, with final units arriving by April of 1993.

The Jayhawk's official name is the HH-60J and it's made by Sikorsky, the same company which made the HH-3F Pelicans. The new HH-60 is lighter and quicker than the old HH-3F, and the water landing floats are not as visible as on the Pelican. Equipped with twin General Electric T700-GE-401C engines, each with 1,662 shaft horsepower, the Jayhawk can cruise at 135 knots and has a maximum speed of 180 knots or about 207 miles per hour. It carries 950 gallons of jet fuel, has a six hour endurance, and 300 mile radius of action.

Like any new model, it has a few bugs yet to be worked out. One that will interest shortwave listeners is its poor HF radio transmitting capability. Longtime coast guard aero listeners familiar



*The helicopter suddenly appears from nowhere to make a low pass and get an overview of the scene before the hoist begins.*

with the old Pelicans and their HF radio range in the thousands of miles, will find they have a rough time hearing the Jayhawks. Their weak transmitters at times have problems getting a signal out even at local distances. This problem is being worked on, according to sources, but meanwhile there is a requirement that any Jayhawk on an mission of over 100 nautical miles from

shore be accompanied by a Dassault HU-25 "Guardian" Falcon jet, which acts as an HF relay back to the ground station.

Each helo has a crew of four: a pilot/aircraft Commander, Co-Pilot, Flight Mechanic/Hoist Operator and a Rescue Swimmer. These crews are top notch pros and routinely fly Search and Rescue (SAR) operations in conditions that would



*Left (port) side view of Coast Guard Heli 6019.*



*Coast Guard rescue swimmer being lowered into the water.*



*Rescue swimmer rides the hoist up out of the water.*

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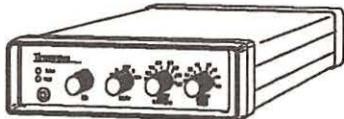
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to an SAR of a vessel 200 miles south of Nantucket. They flew their USAF H-60 "Pavehawk" helo out to the scene. This mission required a refueling from a C-130 tanker at sea. The crew

## HH-60J SIKORSKY HELO INFORMATION

Normal weight with crew and fuel.....	20,000 pounds
Maximum gross weight.....	21,884 pounds
Rescue hoist load.....	600 pounds
Crew.....	4
Passengers.....	6
Rotor Diameter.....	53' 8"

The following airstations are expecting the new Jayhawk Helo

Mobile, AL

San Francisco, CA

Kodiak, AK

Clearwater, FL

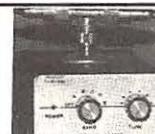
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## CG Aircraft Rescue Frequencies

of the Air Force helo was able to deliver the needed survival gear to the distress vessel, but unfortunately they were not able to make the refueling due to the heavy weather. As they ran out of fuel, a MAYDAY call was sent by radio and they ditched into the Atlantic. Three of the four man crew were pulled to safety by the coast guard cutter *Tamara*, based at Newcastle, NH, but the fourth drowned.

Aircrews from Cape Cod responded to this SAR and in many cases worked extended hours grabbing sandwiches on the run and landing just long enough to get a fresh crew or fuel. The search for the missing airman continued for several days and involved ships and aircraft from the Navy, Air Force, Coast Guard, and even units of the Canadian Air Force responded to help.

### Training with Jayhawk

Cape Cod AIRSTA is located at Otis Air National Guard base, a 1200 acre installation. Crews are constantly training with small boat stations located around the District 1 area when not engaged in actual SAR flights. I recently got to watch one of these training flights at a public demonstration of a hoist exercise using the new helo. "Coast Guard Heli 6019" flew in to meet a 41 foot Utility Boat (LTM) from station Portsmouth Harbor, callsign "Coast Guard 41468." The Jayhawk's arrival was an immediate attention getter as it came in and made a low pass over the crowd watching on shore.

By radio, the helo commander goes over everything in detail by radio with the boat crew before any hoisting is started. In an actual SAR case, instructions are given on VHF Channel 16; in a training mission, they are given on a working channel (23A for Portsmouth Harbor). The boat's crew is advised to clear the deck of any loose objects which could be blown around in the rotorwash from the blades as the helo hovers overhead. Further instructions are to collapse masts and sails if possible and clear any other potential obstructions. Then a "Game Plan" is agreed upon by both helo and boat crew of what to do in the event of a problem with the helo, such as an engine failure. For example, the boat is told to steer right under power, while the helo steers left.

Once all this has been planned, the boat is headed into the wind and the hoist starts. A "Tag Line" is lowered from the helo into the water. The tag line is used to lower tools, pumps, radios, or medical supplies a vessel may need. Then a large, powered hoist is lowered which can be used for a stretcher, sling, or other attachments. On the demo I watched, a rescue swimmer was lowered into the water and picked up by the boat; then on the next pass, the same thing was done in reverse and he was hoisted back up into the helo.

Boat crews are cautioned not to touch the hoist or tag line before it makes water contact.

VHF AIR SEARCH PRIMARY 123.10  
UHF AIR SEARCH PRIMARY 381.80

SECONDARY 122.90 (AM mode)  
SECONDARY 282.80 (AM mode)

Also check your local air traffic center frequencies and coast guard marine VHF radio frequencies. Normal flights identify using "Coast Guard" plus the aircraft's number. In an SAR case, the words "Coast Guard Rescue" are used followed by the number.

HF Radio Guard is kept with a COMMSTA or AIRSTA while in-flight. The COMMSTAs have 10 kW transmitters and multiple antennas, while the AIRSTAs, like Cape Cod, have SUNAIR GSB-9000SX transceivers and vertical whips running about 1,000 watts output.

HF VOICE AERO PRIMARY (Large AIRSTAs) 5696 kHz  
" " " SECONDARY " " 8984 kHz

(Smaller stations may use 5692/8980 respectively for short range work.)

HF VOICE ALTERNATE 11201 kHz (often used by new Jayhawk models)  
HF VOICE ALTERNATE 3123 kHz (rare usage)

INTERNATIONAL DISTRESS 2182 kHz (ships, aircraft and shore stations)  
INTERNATIONAL SAR 3023 and 5680 kHz (vessels and aircraft)

OTHER CG VOICE HF frequencies: 2638, 2670, 4125 kHz (ships mostly)

In addition, see the *Grove Shortwave Directory* for the 4, 6 and 8 MHz duplex pairs of the "SCN" (Systems Control Network), which are used by ships to contact coast guard shore stations at any time for assistance at sea.

This is because the rotorblades of a helo generate huge static electricity charges, and touching a cable before it is grounded to the water could result in serious injury or death.

### Rescue Communications

A typical rescue case begins when a boater calls a coast guard station with a radio distress or MAYDAY call. The station obtains information as to the nature of the emergency, vessel information, and, in the case of a medical case, patient condition. This is then relayed to the District ROC (Rescue Coordination Center). Here specialists determine the appropriate response and if a hoist or medevac is needed they alert the AIRSTA.

In all aircraft missions radio plays a vital role. When a Jayhawk departs from the AIRSTA, they call the base control tower on VHF for take-off clearance. They also initiate an "HF Radio Guard" with COMMSTA Boston, MA. As they fly to the scene they stay in contact with air traffic control on VHF. They may also call military air or sea units on scene using UHF radio. In a medevac case, they also use radio to call local fire or police or hospitals to update them on the arrival time and patient's condition.

At about 50 miles from a vessel in distress, the aircraft begins calling on VHF Channel 16 and once contact is made, they ask the boat for a long radio test count. This enables them to get

a DF (Direction Finding) fix on the boat for pinpoint accuracy. The Jayhawk helos have HF, VHF and UHF radio capability in both voice and non-voice modes, as well as AM/FM and single sideband. In addition, a Collins RCVR-3A Global Positioning System (GPS) unit receives signals from a constellation of 21 satellites. Using signals from four of the 21, it gives the crew a very accurate fix of their latitude and longitude at all times while in flight. In addition, there are the avionics radios used by pilots for flight navigation in IFR (Instrument Flight Rules) conditions, as well as radar.

It's comforting to know we have these dedicated people serving us on SAR cases in offshore areas every day all year long. Many fishermen, pilots and sailors owe their lives to these crews about which we seldom hear or read much in our news sources. See the accompanying table for a list of the key radio frequencies used by Coast Guard air crews. By using these, you can listen for yourself to get an idea of the incredible work these people do, and you have the luxury of doing it in the comfort and safety of your home monitoring post.

MT

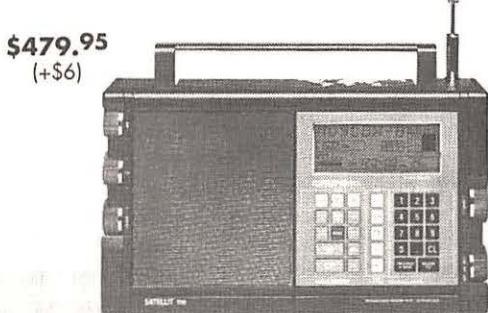
*I would like to thank Lieutenant Commander Donald Thompson of Coast Guard Station Portsmouth Harbor, NH, and Lieutenant Junior Grade C.S. Bazzano of Air Station Cape Cod, MA, for their patience and assistance in making this article possible.*

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# The Unique Story of TI4NRH

Story and photos by Don Moore

A few summers ago, when my wife and I traveled to Costa Rica for three weeks, I decided to learn what I could of an oldtime Costa Rican broadcaster, Amando Cespedes Marin in Heredia. I had seen mentions of TI4NRH in radio history articles, and although the station had been gone for years, I hoped to find exactly where it had been located from the townspeople. With luck, the building would still be standing and would make an interesting picture.

The first few people I asked only gave me puzzled glances, but soon a shop owner replied "Yes! His daughter, Lydilia, is a good friend of mine. She still lives in the same house, down the street two blocks and around the corner. There's a plaque on the door."

Could it be true? I hurried down the street and found the house, with a plaque commemorating the birthplace of Costa Rican radio. I knocked, and an elderly woman answered. I introduced myself and explained my interest in the station. She was ecstatic that someone would come to learn about her father after so many years. She invited me to return with Theresa that evening.

We talked that night about her father and TI4NRH for nearly an hour. Finally, it seemed as if we had passed some sort of test. She opened a locked door and invited us into an adjoining room. Old newspapers and boxes were strewn about, the light was dim, and a blanket of dust covered everything, but there was no doubt about it. Although the station had been gone for nearly fifty years, everything was still there—transmitters, microphones, reception reports, even hundreds of yellowing ham cards stapled to the walls. This was radio history paradise.

## Don Amando

Amando Cespedes Marin was born on August 1, 1881, in San Jose, but his family soon moved to the port of Puerto Limon where his father found work with the customs office. Young Amando taught himself English while in primary school, and then earned money by teaching English to Ticos (native Costa Ricans) and Spanish to Jamaican migrant workers. He planned to travel to New York City and look up relatives

there. Soon he had saved the 360 colones to buy a steamer passage and, although only eleven years old, was on his way to New York City, alone, to seek his fortune. In New York, Amando found that his relatives had moved and no one knew their whereabouts. But an American couple took him in and taught him to be, in his words, "a little gentleman."

In New York, Amando continued to teach Spanish during the day, and went to school in the evening. Later, he found work assisting a traveling merry-go-round salesman. For several years, they journeyed together throughout the U.S. and Canada. Then one day his boss looked at a map and saw Costa Rica. Turning to Amando, he said, "We've never sold anything there. Get ready to travel to your country."

Several weeks later, Amando arrived in Puerto Limon. The boy, now a young man, had changed so much that his family didn't recognize him at first. But, family wasn't why he returned; Amando had brought with him a steam-driven carousel. Nothing like this had ever been seen before in Costa Rica. He set it up in Puerto Limon and made

*The station equipment  
—and much else—  
now fills the  
old station room.  
The bust is of  
Don Amando.*

*Historic TI4NRH QSLs are courtesy of The Committee to Preserve Radio Verifications, a committee of the Association of North American Radio Clubs. For more information on CPRV, write Jerry Berg, Chairman, 38 Eastern Avenue, Lexington, MA 02173.*





*The Cespedes family house, home to TI4NRH. The station was located in the wing to the right.*

3000 colones profit the first night. Within a few days, there wasn't a Limonense who hadn't ridden it.

Amando took it to San Jose, where it also proved an instant success. When a businessman bought the carrousel from him for \$10,000, Amando faithfully bought another ticket to the U.S. to pay his boss. But his boss had never really expected him to return. He looked the teenage entrepreneur in the eyes and said, "I have never given you anything. The 10,000 dollars, it's yours."

Suddenly rich, Amando pursued another of his many dreams by attending and graduating from the Illinois College of Photography in Effingham. He learned the trade well, and in 1901 opened a photography shop in Puerto Limon. He did excellent work and prospered, so he soon branched into printing, starting and editing Costa Rica's first national newspaper. In 1904 he was part of Costa Rica's delegation to the St. Louis Exhibition, where he won a silver medal in photography.

Always a man of science, technology fascinated Don Amando, and when motion pictures became popular in the U.S., he brought the first movie to Costa Rica and showed it in San Jose. Soon after, he bought a Kodak movie camera and made the first movie in Costa Rica, filming a conference in San Jose. He also filmed the arrival of the first plane in Costa Rica, later noting "The pilot bought the film at a good price."

Finally, matrimony caught up with him, and in December, 1911, he married Rosita Arias. Soon after he moved his family and print shop to the little town of Heredia, a few miles from San Jose.

## Radio Beginnings

Don Amando was always looking for something new to do, and in the early 1920s, radio was

it. He got some American radio magazines, and on November 2, 1923, built a one tube regenerative set. His evenings were filled with listening to stations like KSD, WGY, WSAI, WTAM, KFKX, KGO, and CYB. He began sending reception reports, and his first QSL was from a Mexican station. He continued receiving U.S. radio magazines and built bigger and better receivers. Other Costa Ricans were also interested in hearing these voices from far away, and soon Don Amando had a one man receiver factory. He remembered later, "I made about 800 receivers, which I sold to anyone who asked me. Such was the interest in radio, that one day I had more than 40 cars in front of my house, their drivers looking for radios."

Soon Don Amando felt the urge to transmit, and in December, 1924, he built a pair of MW transmitters using 201-tubes and talked with a friend five miles away. A few days later he broadcast some phonograph records and fooled some other friends into thinking they were hearing an American station. For the next two years, he continued to experiment with MW transmitters until in January 1927, he began regular AM broadcasting with a five watt transmitter. The new station, Costa Rica's first, was popular, but couldn't be heard very far, so he decided to experiment with shortwave in hopes of reaching farmers up to 100 miles away.

His first shortwave transmitter used six tubes with 7-1/2 watts output, and measured just 10x8 inches. On May 4, 1928, the new SW station was ready to go on 39 meters. As Don Amando explained later, "Due to my interest in radio, I tried to eliminate wire from the MW tubes to convert the station to shortwave. For better reception, I put a fifteen meter bamboo antenna on the roof. Such was the surprise when my wife Rosita heard me at 10 meters, I asked her 'How many eggs have the hens laid? ... The surprise was

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Amando Céspedes Marín, Ingeniero  
Director de la NRH

Nº 44668

Muy agradecidos por habernos escuchado en esta frecuencia el día 11 de Jan de 1938 de las 6 a las 7 p. m. (P. S. T.)

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Los Angeles, California

Creador de la Estación NRH, 1922  
Director de la UNION RADIO AMERICANA, 1932.  
Miembro Correspondiente del Centro de Historia, Santander, Colombia, 1933.  
Miembro Honario de Asociación EAR, Madrid, España, 1929.  
Santiago Radio Club, Cuba, 1932.  
Society of Wireless Pioneers, USA, 1934.  
Radio Club Venezolano, Caracas, 1934.  
Chicago Short Wave Radio Club, USA, 1935.  
International Dx'ers Alliance, USA, 1936.



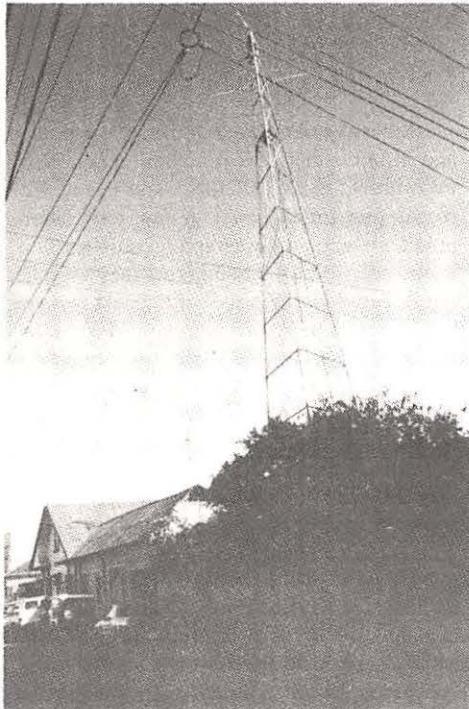
bigger when a letter arrived from Gatun, Panama, saying he had heard me saying those exact words... This was very emotional to me and I decided to dedicate myself to SW." That first report, the first reception report ever to a Latin American SW station, was from Henry P. Karr\*, an American living in the Panama Canal Zone.

A few weeks later he received a report from Guayaquil, Ecuador, 1200 miles distant, and on July 1 a Havana newspaper mentioned monitoring TI4NRH. Soon more letters were received from the Caribbean, Central and South America. TI4NRH wasn't noticed in the U.S. until the October 1928 issue of *Radio News*, when Charles Schroeder of Philadelphia mentioned hearing but not being able to identify a Costa Rican station. By this time, Don Amando had changed frequency from 39 meters to 30 meters. North American DXers began looking for the station, and by December 1928, he was flooded with reports. Schroeder had soon identified the station and sent the first reception report from the United States.

## More Letters

Don Amando soon began receiving reports from all over the Americas and other continents, as well as ships at sea. Sometimes he would get over 100 letters in a single day. J.M. Adair heard TI4NRH at Guantanamo Naval Base and wrote, "When I finally heard your announcement, I was sure that I had a station in Arabia. There is quite a bit of similarity between Heredia and Arabia." Leo R. Schultis of Richmond Hill, NY, noted, "I was marvelled at your announcement that you were using only 7-1/2 watts and 500 volts on plate. Hold on to the transmitter you are using

because it is a good one." Henry Hart of Wankie, Rhodesia, heard TI4NRH at 1 A.M., his local time when he couldn't sleep because of a toothache. Tuning his Pilot radio, he came across Spanish music, then an English ID. He wrote "I have to thank you for the broadcast because I forgot my tooth pain. How delicious I did feel then..."



This magnificent steel tower was a gift from U.S. radio listeners in 1938.

A DXer himself, Don Amando knew that DXers wanted QSLs, and he obliged. He used his printing and photography skills to produce some of the most attractive QSLs ever issued, and churned them out by the thousands. Every letter was answered. As *The Panama American* noted, "Nothing pleases Mr. Céspedes more than hearing from his unseen audience. A note to him about his station and his programs will promptly bring a form card or lengthy letter in reply."

Meanwhile, the Costa Rican government noted the international goodwill for Costa Rica that TI4NRH was creating, and on June 19, 1929, decreed that thereafter Don Amando's mail would not cost him a cent as his work was considered a diplomatic service. It was a good thing, too. By the end of 1939, TI4NRH had received and answered over 110,000 reports in 11-1/2 years of broadcasting!

Although Don Amando's print shop remained his livelihood, TI4NRH became his life. Despite demands of business and family, he always maintained a regular schedule, although it did change from time to time. The broadcasts were usually an hour long, starting at 9:30 or 9:45 pm CST. Sometimes he was on nightly and other times on three nights a week, generally Tuesday, Thursday, and Saturday. Each broadcast began with "The Parade of the Wooden Soldiers," to allow DXers time to tune in. He got out well on 31 meters, but changed frequency several times.

TI4NRH had a loyal following of listeners throughout the world, and while the programming was simple—music and small talk—no one ever felt shorted on entertainment. Often Don Amando's daughter and three sons would join him. His youngest son, Alvarito, made his first appearance at 45 days old by crying into the microphone.



This plaque commemorates Don Amando's house as the birthplace of Costa Rican radio.

Although SW was his love, Don Amando continued his AM station for local coverage, and even it was sometimes heard by DXers. The MW station changed frequency several times and was eventually moved to San Jose and given to one of Don Amando's sons.

## Low Power

When Don Amando went on the air in 1928, he became only the fifth SW broadcasting station in the world, and the first from Latin America. However, his low power didn't even compare with the four other SW stations. KDKA and WGY were using 50,000 watts, Philips in Holland 40,000, and the BBC 30,000. No one could believe that TI4NRH could be using just 7-1/2 watts.

The Westinghouse Company sent two KDKA engineers to confirm TI4NRH's power, and they proved Don Amando wrong—the engineers measured only 5 watts! They even used the transmitter to call their Pittsburgh office and report 5 watts and 500 volts. After that, KDKA engineer Mr. Evans named Don Amando KDKA's little brother. Don Amando returned the favor by calling KDKA his big brother, and regularly relayed KDKA over his MW transmitter for Tico listeners.

Although TI4NRH was getting out well enough with very low power, many listeners begged Don Amando to increase power to be heard more easily. He appealed to listeners for funds for equipment, and as TI4NRH had proven itself a DXer's friend, the DX World responded. Soon he had enough to buy parts for a 150 watt transmitter. With further assistance, he was using 200 watts by 1933 and 500 watts by 1938.

The biggest gift came in 1938 when, as Don Amando later wrote, "At 10 years of NRH, the world celebrated 'perifonias' in the memory from Berlin to Buenos Aires. US radio hobbyists made

a gift of an iron antenna tower as a prize for my efforts." President Cortes waived import duties on the tower and arranged for an elaborate ceremony to be held upon completion of its construction at Don Amando's house. The military band played and President Cortes gave a speech awarding Don Amando a special diploma.

## Famous Friends

Don Amando had a way of meeting interesting people. During one of Richard Byrd's Antarctic expeditions, Don Amando kept in 2-way radio contact with the expedition for several days using his 7-1/2 watt transmitter. On the way home, Byrd's ship docked in Costa Rica and the Admiral journeyed to Heredia for a visit.

In the mid-1930s, Don Amando and two of his children traveled through Central America and Mexico visiting some of his many radio friends. When they arrived at the Guatemala City train station from El Salvador, listener Juan Guillen picked them up in a chauffeured car. After a motor tour of the city, they arrived at Senor Guillen's residence, the Guatemalan Palacio Presidencial! Senor Guillen revealed that the name was only his radio pseudonym; in reality he was General Jorge Ubico, el presidente!

Don Amando and his children spent a week at the palace and the general's coffee farm outside the city. For the remainder of their time in Guatemala, they were accompanied by a military honor guard and were received as honored guests by government officials in many towns and cities. Per General Ubico's wishes, all the expenses of their travels in Guatemala were paid for by the government.

A few years later while bandscanning on his receiver, Don Amando picked up some American sports fishermen talking from Costa Rica's Cocos Island. Don Amando broke into the

communication and asked them who gave them permission to fish in Costa Rican waters. Back came the reply, "Well, nobody, because there's nobody here to ask it of—only the tuna and I."

The speaker was Commander Eugene Francis McDonald, Jr., owner of Zenith Corporation. They continued the conversation and a friendship formed. The Commander sailed his yacht to the mainland and went to Heredia to visit Don Amando. Later, Commander McDonald chose Don Amando to publish a Spanish magazine, *Cenit* (Zenith) to promote radio and Zenith in Latin America. With Zenith's financial sponsorship, Don Amando published the monthly magazine for the rest of his life. It was sent free to his friends and numerous radio hobbyists in Latin America.

## The Final Years

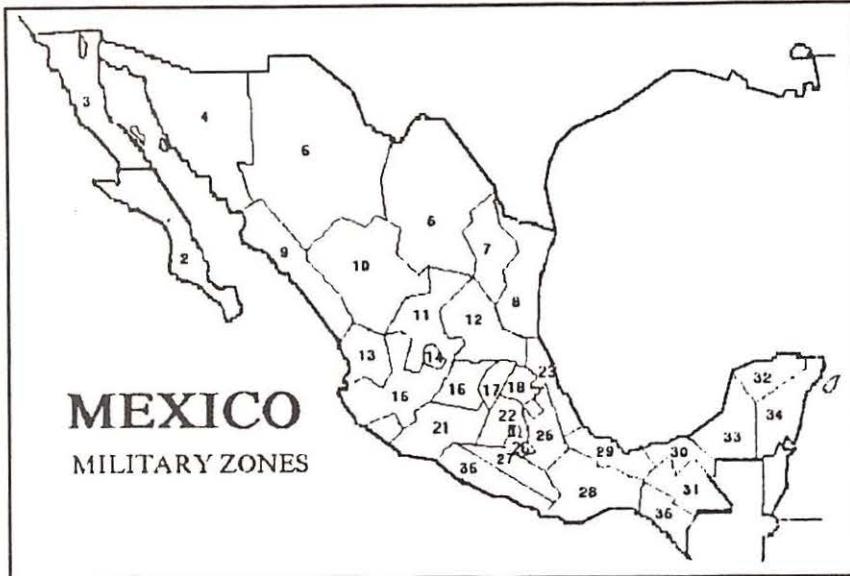
When World War II came along, Don Amando cut back his transmissions and then ended broadcasting altogether. He was in his sixties and semi-retired, ready to pursue other interests. Now much of his time went to setting up letter networks among people in Latin America to support international friendship. *Cenit* magazine, with the continued support of Zenith, turned from being a radio publication to one focusing on international understanding. His efforts were so well respected that in the early 1970s hundreds of letters were written from Latin America to the Nobel Prize Commission in Oslo, nominating him for the Nobel Peace Prize.

Don Amando wanted to live to be 100, and very well might have. But on March 17, 1976, he journeyed down to the coast to watch an eclipse. While there he caught a cold and three days later died at home. He was not forgotten, however. His adopted hometown of Heredia named a street after him, and the Rotary Club put up plaques honoring his achievements. In 1981, on the 100th anniversary of his birth, he was awarded Costa Rica's highest honor, the "Benemerito de la Patria."

Although Don Amando and TI4NRH are gone from the shortwave dial, the station lives on. Don Amando's AM station in San Jose stayed under his son's management for many years, and then was sold to a businessman, who renamed it Radio Lira. A few years later, the station was sold to the Adventist church, which moved it to the suburb of Alajuela and has been gradually adding shortwave transmitters. Today, TI4NRH's grandchild, Radio Lira, is one of the principal international broadcasters of Latin America. Don Amando would be proud.

M

\* Karr's U.S. address was 700 Opel St., Great Bend, KS. If any KS DXers can locate his family and the QSL still exists, it would be quite a find! It was the first Latin American SW QSL.



# Monitoring the Mexican Military

By Mike Lima

**M**odern communications technology has given the shortwave listener quite a few advantages in the past several years. But, alas, along with fancier consumer receivers have come still fancier commercial/military transceivers which boast features like digital voice and data encryption. Countries with small budgets have been enabled to equip their military forces with increasingly secure forms of communication—Latin American countries in particular.

Although one can still listen to voice and radioteletype on shortwave, much of what can be heard is very cryptic. Imagine my delight, then, when I came across a utility communications net that, although in Spanish, was easy to hear and contained very little jargon or enciphered messages, contrary to the norm for Latin American utility communications. For several months I had ignored these radiograms when I encountered them during routine searches of 4000 to 7000 kilohertz (where most Latin American military voice communications are found). Not until interest in my usual listening targets faded did I decide I should spend some time listening to the radiograms.

These "radiogramas," as they are called, are the HF (shortwave) voice communications of the Mexican army, air force and navy. Most of these communications represent the roughly 50 HF

voice nets used by the Mexican army's brigades, battalions, regiments, and detachments. These units are located in Mexico's 10 military regions (MR) and 36 military zones (MZ). The above map shows the location of most of the zones.

The nets are organized according to region and zone. Each military zone uses a certain frequency for messages from units inside the MZ to the zone commander at the MZ headquarters (usually the capital of the state in which the MZ is collocated). The frequency used by the MR is for messages from MZ commanders to MR commanders and messages from MZ and MR commanders to the Secretary of National Defense in Mexico City (Army and Air Force Headquarters, Lomas de Sotelo, Distrito Federal).

All communications are sent using voice or CW (Morse) on USB (Upper Side Band) and are most easily heard in the early to late evenings and well into the morning hours. These communications are easily identified as Mexican military by the characteristic format of the radiograms and by the Mexican radio operators' practice of sending the radiogram by voice while the receiving operator acknowledges using Morse. Call-ups are often sent in Morse as well. Reception varies considerably from frequency to frequency due to distance and terrain, but the nets operating along the U.S./Mexican border, the U.S. Gulf Coast, and the Yucatan Peninsula all come in well from my position in the U.S. midwest. Other areas are quite sporadic as far as my reception is concerned.

My equipment is modest: A Realistic DX 440 attached to a simple and easily constructed 66 foot dipole antenna. This seems to work well, as I can usually get good reception on three or four of the nets each night. Some nets, like the 29th military zone in southern Veracruz on 5485 kHz, are extremely active and can usually be heard for two to three hours each evening.

## What is the Mexican Military?

In the past, the Mexican military has had a reputation as being one of the most poorly equipped and ill-trained military forces in the world. Since beginning an aggressive modernization program during the 1970's, the Mexican armed forces have replaced their inventory of WWII-vintage equipment with a large variety of mostly new weapons and have also greatly enhanced the training that military personnel receive.

The most important part of this inventory so far is the approximately 24 Northrop F-5 Tiger II supersonic fighters in the air force. The air force also uses C-130 cargo aircraft. The Mexican navy has benefitted with the addition of eight 220 foot and four 230 foot patrol ships, some of which were built in Mexico. The Mexican navy still maintains, partly for training purposes, a large variety of ex-U.S. Navy destroyers and frigates.

The Mexican Army, the largest branch of the Mexican military and the focus of these communications nets, is composed of about 100,000 active duty personnel. Important ground forces acquisitions in the last 15 years include: Panhard ERC-90 armored vehicles from France, DN-3 and DN-4 armored personnel carriers manufactured in Mexico, Panhard Ultrav light armored vehicles equipped with MILAN anti-tank weapons, "Hummer" utility vehicles from the U.S., G-3 automatic rifles made in Mexico as part of an agreement with HK of Germany, and UH-60 Black Hawk helicopters from the U.S. There is still a sizeable inventory of the 40's vintage equipment as well, which may or may not be in service with the Mexican armed forces.

You may ask: What is the role of the Mexican military? Their mission is primarily internal security. The Mexican army has at least two infantry battalions (BI) at each military zone

## Mexican Military Phonetic Alphabet

These are the phonetics used by the Mexican Army and Air Force in their radiograms. The Mexican Navy uses NATO phonetics.

A Ala	H Hache	N Nandu	U Urraca
B Bota	I Indio	O Oso	V Vaca
C Cruz	J Jaro	P Palma	W Washington
D Dedo	K Kilo	Q Queso	X Xochil
E Estaca	L Litro	R Raton	Y Yate
F Foco	M Mano	S Soltan	Z Zapato
G Gato	N Negro	T Torreo	

## Abbreviations and Acronyms

Military terminology can be looked up in an appropriate dictionary, but acronyms and abbreviations used in the Mexican Army radiograms are more difficult to nail down. Here is a list of such terminology, all of which have been heard on the radiogram nets.

BANAMEX	NATIONAL BANK OF MEXICO
BANJERCITO	NATIONAL BANK OF THE ARMY
BI	INFANTRY BATTALION
BMG	COMBAT MATERIALS BATTALION
BO	OPERATIONS BASE
CAMP	FEDERAL MILITARY/CIVIL PROSECUTOR
CG	COMMANDER OF THE GUARD
CNC	NATIONAL CAMPESINO CONFEDERATION
COI	COMPANY
CROC	REVOLUTIONARY CONFEDERATION OF WORKERS AND FARMERS
CTM	CONFEDERATION OF MEXICAN WORKERS
DEM	GENERAL STAFF GRADUATE
DEMA	AIR STAFF GRADUATE
DF	FEDERAL DISTRICT
DFS	FEDERAL DIRECTORATE OF SECURITY
DN	DETACHMENT
EUA	UNITED STATES OF AMERICA
EEUUMM	UNITED STATES OF MEXICO
EMM	MILITARY MEDICAL SCHOOL
FAM	MEXICAN AIR FORCE
FAPA	PILOT TRAINING GRADUATE
HMR	REGIONAL MILITARY HOSPITAL
ISSFAM	ARMED FORCES INSTITUTE OF SOCIAL SECURITY
LFAFE	FEDERAL FIREARMS AND EXPLOSIVES LAW (MILITARY MOVEMENT CENTER)
MILMOFI	MINATITLAN, VERACRUZ
MINA	NUEVO LEON
NL	SPECIAL OPERATIONS
OE	PARTY OF NATIONAL ACTION
PAN	MEXICAN COMMUNIST PARTY
PCM	MEXICAN PETROLEUM COMPANY
PEMEX	FEDERAL JUDICIAL POLICE (SIMILAR TO FBI)
PJF	MILITARY POLICE
PM	NATIONAL REVOLUTIONARY PARTY
PNR	INSTITUTIONAL REVOLUTIONARY PARTY (DEMOCRATIC REVOLUTIONARY PARTY)
PRI	ARTILLERY REGIMENT
PRD	ARMORED CAVALRY REGIMENT
RA	MOTORIZED CAVALRY REGIMENT
RCB	MILITARY REGION
RCM	TRANSPORT REGIMENT
RM	SECRETARY OF NATIONAL DEFENSE
RT	SAN LUIS POTOSI
SDN	NATIONAL MILITARY SERVICE
SLP	TAMPICO, TAMAULIPAS
SMN	ECONOMIC EXCLUSIVE ZONE
TAMCO	MILITARY ZONE
ZEE	
ZM	

headquarters and also maintains a much larger military presence in the area surrounding Mexico City. They also protect the nation's economic resources. The Mexican Navy utilizes its patrol craft to maintain control over the Economic Exclusive Zone in the Pacific Ocean. In the past there have been many disputes with American fisherman over where the respective fishing fleets could operate.

The protection of the vast Mexican oil fields is a high priority as well. The Mexican army maintains a 3,000 man rapid deployment force stationed at various military airports for the protection of the oil fields. Since there is a moratorium on cutting timber in rain forests, the Mexican Army has also been tasked with enforcing this logging ban.

The Mexican Air Force supports the Army with transports and ground-attack aircraft. The supersonic F-5s' are intended for use as interceptors and are routinely scrambled in order to challenge unidentified aircraft. They have also been used in the past as escort aircraft for VIP flights and for U.S. Air Force aircraft passing through Mexico. All three of the services are involved in the antinarcotics effort, with the Navy and Army providing the bulk of support.

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## What is Sent?

For a variety of reasons, mostly economic and geographic, the Mexican ground forces pass almost all their brigade and battalion communications via these HF nets. The low VHF nets, which are audible during skip conditions, are used by units on the battalion and company level. (See the skip feature in January and February issues of *MT*.)

Both of these nets are what I would describe as very open with little or no enciphered messages. The information that can be gleaned from these nets is astounding! The more remarkable messages are those that deal with the antinarcotics efforts of the Mexican government. This effort is called "Plan Canador" and has actually been going on since the late 40's.

The Sierra Madre mountain range is quite rugged and is an excellent area for cultivation of opium poppies and marijuana. The current drug interdiction efforts, as reflected on the voice nets, consist of draconian search and destroy missions by specialized units of the Mexican army. The open messages which detail these missions are after-action reports several days after the fact. These are usually referred to as "Plan Canador" messages and include the units involved; the area searched, given in Universal Transverse Mercator (UTM) coordinates; results of the mission (number and area of opium or marijuana fields destroyed); individuals arrested; weapons and equipment seized; and unit after-action status (casualties, broken equipment). I have been able to listen to at least one of these "Plan Canador" messages every evening on one of four or five nets that have consistently passed this type of traffic.

Not all of the radiograms are as exciting. Most radiograms are of a routine administrative nature and consist of just about any type of day-to-



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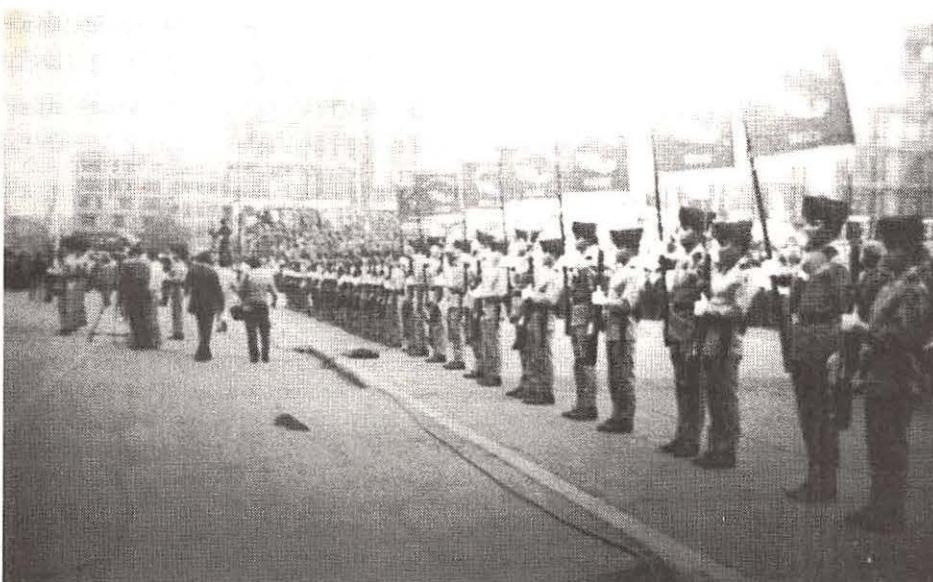
*Troops in the 22nd military zone incinerate 15 tons of illegal narcotics.*

day activity that occurs in a military force. Matters of pay, promotion, disciplinary action, VIP travel, training, weapons inventory, unit status, equipment status, sick leave and vacation, hospitalization, weather, intelligence, etc... Some of it is downright boring; some of the messages are amusing. One I recall in particular, dealt with the discipline of an army major and a lieutenant who got into some trouble at a local "prostibulo" in the red zone and were involved in an "incident" which caused some local folks to be quite upset.

Another type of traffic to be heard is the formatted intelligence report from the subordinate brigades to their military zone commanders. These reports enumerate pertinent events taking place in the military zone and are based on

information gathered by what are called "sector information groups" (GIS). These "informants" attend local political rallies, demonstrations, union meetings, etc. and then make reports to their contact, who in turn produces a written summary to be sent to the zone commander by the brigade intelligence detachment. This information is transmitted "in the clear" to the zone commander on the HF nets!

One such report sent to the 8th military zone commander in Tampico, Tamaulipas, informed the commander of a political and organized labor rally which had recently taken place in a city in the 8th military zone. Included in the report were names of organizers and speakers, names of labor organizations present, number of people who



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*Several National Military Service (SMN) battalions participating in a graduation ceremony.*

attended the event, specific content of the more militant speeches, as well as the general mood of the people attending the rally.

Other events which find their way into these intelligence reports are major criminal/insurgent activity in the respective military zones, such as an armed assault on a financial institution in Reynosa, Tamaulipas, or the assassination of a local tax official in the state of San Luis Potosi.

This type of reporting on local happenings is very common and can be heard several times throughout the week on a variety of frequencies. The zone and region commanders depend on these reports to apprise the Secretary of National Defense on the political climate in their respective zones. The zone commanders have a great deal of responsibility and political power; in a crisis situation they may take over as governor of their corresponding state.

### Radiogram Format

The format used by the Mexican army to send any kind of traffic is generally the same on all the HF and low VHF voice nets. This consistency makes the messages easier to understand, since you know what is coming up next. The operators who send these messages also use plenty of phonetics to spell personal names, place-names, and even common words. (These are spoken first and then spelled).

The difficulty of understanding these messages is not in the spoken Spanish, as this is usually spoken clearly and slowly. The hard part is dealing with the phonetics (see phonetic list). These are probably the most poorly designed phonetic letters I have ever come across. Several of the letters are so close in sound as to make them, at times, impossible to distinguish. I am almost convinced that this is intentional so as to provide a bizarre form of security.

If so, it often works against the radio operators as there are many repeats and corrections made. For example, the letter "R" (Rata or Raton) sounds very similar to "U" (Urraca) and also to "V" (Vaca). Other than this, if you know a little Spanish, you can understand the main body of these radiograms. Here is the general format:

**RADIOGRAM NUMBER:** A one-up daily serialization used only by the radio operators for bookkeeping.

**UNKNOWN:** A 4-5 figure group beginning usually with "X" and followed by various numbers and letters (maybe a message classifier or authenticator).

**GROUP COUNT:** Number of words or code groups in message text

**TIME MESSAGE WAS WRITTEN:** Usually a few hours before time sent

**MESSAGE PRECEDENCE:** This is almost always "Radio ordinario" or "Radio urgente"

**WHO FROM:** Almost always a place-name, but can be any unit name or individual. This is sometimes only the location of the radio operator sending the message and may not indicate who the message is actually from.

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**WHO TO:** More specific than above with officer's title, name, unit, military zone/region.

**NAME OF UNIT MESSAGE IS FROM:** Or unit that is being referred to in message.

**MESSAGE NUMBER:** This is the actual number of the message text assigned by the unit sending the message. This number will always refer only to this specific message.

**DATE OF MESSAGE:** Usually that same day: "Fecha de hoy" or sometimes tomorrow: "Fecha mañana."

**MESSAGE REFERENCE:** Unit, message number, and date of any previous message which needs reference.

**MESSAGE TEXT:** With plenty of flowery speech at beginning of text. The Mexican Army is extremely proper so far as military etiquette is concerned.

**NAME OF ISSUING OFFICER:** Includes title, rank, name, and billet.

**COPIES TO OTHER UNITS:** When any other unit is to receive this same message. Preceded by "con copia para."

**OBSERVED LOCAL TIME**

**TRANSMITTING RADIO OPERATOR INITIALS**  
**RECEIVING RADIO OPERATOR INITIALS**

## Radiogram Examples

Here are some typical messages which can be often heard on a variety of frequencies. This one is from just across the Rio Grande in Reynosa, Tamaulipas, and is for the commander of the 8th military zone in Tampico, Tamaulipas. This is a pretty common message which deals with how many personnel a unit should have, how many they actually have on their roster, and how many are actually available:

**MEXICAN GROUND FORCES ON 5500 KHZ**  
**APRIL 17, 1992 1130 PM EDT**

SALE NUMERO 2 X7Z8 DE 70 PALABRAS 0600  
RADIO ORDINARIO SALE DE REYNOSA Y VA  
PARA EL COMANDANTE DEL OCTAVA  
COMANDANCIA NUMERO 1386 DE FECHA  
MANANA PUNTO Y SIGUE CUMPLIMIENTO  
SUPERIOR RADIOPRAGMA 1471 DE 7 FEBRERO  
91, GIRADO POR CUARTEL GENERAL,  
RESUMEN EFECTIVO ESE GUARDACION DEBE  
TENER SEGUN PLANIA ORGANICA:  
1 GENERAL, 2 JEFES, 8 OFICIALES, 19  
TROPAS, 1 VEHICULO;

TIENE DE FUERZA:

1 GENERAL, 1 JEFE, 4 OFICIALES, 18 TROPAS,  
1 VEHICULO;  
MENTIONADOS PERTENECIENTES A OTRAS  
UNIDADES: 1 TROPA PERTENECIENTE DN-10 Y  
1 TROPA PERTENECIENTE DN-18;  
SERVICIOS INTERNOS:  
1 OFICIAL Y 4 TROPAS;  
VACACIONISTAS: 1 OFICIAL Y 1 TROPA;  
DISPONIBLES: 1 GENERAL, 1 JEFE, 2  
OFICIALES, 13 TROPAS Y 1 VEHICULO.  
RESPECTUOSAMENTE LO FIRMA GENERAL  
BRIGADIER DIPLOMADO DE ESTADO MAYOR  
(NAME OF ISSUING OFFICER): COMANDANTE

Enciphered messages are almost always "urgente" and are sent using the Mexican army phonetic alphabet. "KT2" seems to be the type of encipherment system used and is followed by the number of letters in the message "G789". The system used (for those who are into such things)

seems to be a keyed columnar transposition. There are a large number of books available on the subject of making and breaking codes and ciphers, and, with some work, this particular cipher system can be broken.

Most of the groups in the message below have been omitted:

**MEXICAN GROUND FORCES ON 5485 USB**  
**MARCH 17, 1992 0115 PM EDT**  
NUM 55 CON 170 23 ZONA ORDINARIO DE  
OAXACA  
PARA COMANDANTE DE LA 29 ZONA MINA  
CUARTEL GENERAL 8 REGION MILITAR Y 28  
ZONA MILITAR  
NUMERO 4551 DEL FECHA DE HOY  
"KT2G789"  
EMPEZAMOS CON LA CLAVE EMPEZAMOS  
CON LOS GRUPOS ESTE  
NONII ONADA EACNM OUAAL ESOTA UEEGC  
RAION CUUDA YMEIS ASPEM  
NOPRT DSFTT RSECO IAENU OECIA DASVM  
EDOES DOIVA IOTOP IENAO  
MCCAC EAEAD AURST SOOOO TDNNA SRODT  
AREAR SOMIN PIMAA UITES  
OILSP POANT NOEED PEOPE RLLAE UCTOE  
EEOPG AOYUA SONAT DITS  
PUNTO Y SEGUIDO ATENTAMENTE  
GENERAL DE DIVISION DIPLOMADO (NAME)  
COMMANDANTE 2335  
GHJ (TRANSMITTING OPERATOR INITIALS)  
QRU?  
OIU (RECEIVING OPERATOR INITIALS)

Below is a typical example of the messages relating to the antinarcotics efforts called "Plan Canador." This message lists the areas searched, the number of marijuana fields destroyed, detentions, casualties, and weapons seized. Note the four digit UTM coordinates. The key expressions to listen for in this type of radiogram are:

- Plan Canador
- LFAFE (Federal Firearms and Explosives Law)
- Enervantes (drugs)
- Reconocimiento
- Plantios de marijuanna (marijuana fields)
- Plantios de amapola (heroin poppy fields)

**MEXICAN GROUND FORCES ON 5495 USB**  
**MARCH 1992 2345 PM EDT**

APPLICACION PLAN CANADOR Y LFAFE Y E; ASI  
VOY A CITAR A SU UNIDAD EN LA ZONA  
ALCANZARON L. C. NUMERO "CINCO" SIN  
NOVEDAD EL JEFE ESTABILISIENDOSE EN  
CIERTOS PUNTOS PARA VER CON CUAL  
COMO EXIGE: PLATA 1 (OP 5222) PLATA 2 (OP  
5922) PLATA 3 (OP 2321) PLATA 4 (OP 2225)  
PLATA 5 (OP 5226) PLATA 6 (OP 4622) ASI  
MISMO ACTIVIDADES OPERATIVAS (4629)  
PROXIMO DIA ES COMO EXIGE: 6  
AGRUPAMIENTOS PLATA DE ACTUAL  
UBICACION ALCANZARON L. C. NUMERO "SEIS"  
EFFECTUANDO RECONOCIMIENTOS SOBRE  
SIGUIENTES AREAS: PLATA 1 (PR 5434) (PR  
6044) (PR 5422) (PR 4422) PLATA 2 (PR 6044)  
(PR 7134) PUNTO RESPECTUOSAMENTE  
RESULTADOS: 200 PLANTIOS DE MARIJUANA  
DESTRUIDOS DE MUCHAS EN UN TOTAL DE 13  
HECTAREAS DE MUCHAS, UNO DE PRIMERO  
DETENIDO Y DE YATE DOS DE SEGUNDO

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## Callsigns Monitored

CALLSIGN	IDENTIFICATION
AGUILA	ARMY HQ, LOMA DE SOTELO DISTRITO FEDERAL
AZTECA	8TH MR HQ IXTEPEC, OAXACA
BUFALO	UNIDENT BN IN 8TH MZ
COMETA	6TH MZ HQ SALTILLO, COAHUILA
CONTINENTE	32ND MZ HQ AND 10TH MR HQ MERIDA, YUCATAN
JAGUAR	UNKNOWN UNIT IN 8TH MZ
JAPON	UNKNOWN UNIT IN 9TH MZ
LEON	77TH BN CIUDAD VICTORIA, TAMAULIPAS
LEOPARDO	8TH MZ HQ TAMPICO, TAMAULIPAS
LOBO	UNKNOWN BN AT TAMPICO, TAMAULIPAS
MARTES	22ND BN AT OAXACA, OAXACA
MARTILLO	34TH MZ HQ AT CHETUMAL, QUINTANA ROO
OSO	29TH MZ HQ AT MINATITLAN, VERACRUZ
POLAR	28TH BN AT TECOMAN, COLIMA
SAFIRO	20TH MZ HQ AT COLIMA, COLIMA
ZAMBIA	4TH MR HQ AT MONTERREY, NUEVO LEON

05	5524	13,14,15	5430/5528
06	..	(16,17,18,21)	..
07	6804/5731	30,31,36	5434/5480
08	5485	23,28,29	5790
09	5427	27,35,(25)	5427/5582
10	5510	32,33,34	6670

Other Mexican military frequencies not yet associated with a region or zone:

MEXICAN NAVY: 4368/4390/6660  
 MEXICAN AIR FORCE: 6693  
 MEXICAN ARMY:  
 4710/5200/5232/5260/5434/5495/5519/5550/5582/  
 5585/5714/5736/5793/5795/6693/6758/6925/6955

## Low VHF Skip Communications

When atmospheric conditions permit, the Mexican army can also be heard on low VHF. These communications are identical to those heard on shortwave but are from smaller units of the Mexican army (companies, detachments, etc.). The communications take place between 38.00 and 42.00 megahertz. This summer there should be plenty of Mexican military communications on this range of frequencies (sporadic-E skip). For best results monitor between 10 am and noon.

Most of the communications seem to be centered around 41.00 MHz. Try 41.85 or 41.28 MHz, especially. On several occasions I have heard the Mexican army radio operators make reference to a teletype net. This may be a landline teletype net, but some of you RTTY listeners might want to keep this in mind when you run across any unidentified Spanish-language RTTY stations.

## Spanish or English?

Don't think that you absolutely have to know Spanish to get anything out of these communications. Many Spanish words are very similar to their English meanings. Record the clearer and stronger stations operating along the Gulf of Mexico and play back the tape a few times. Listen for common words that give an indication of who, what and where, for example, "29 zona militar, 77 Batallon Infanteria, comandante, teniente coronel."

I believe that if you spend a little extra time listening to these communications, you can have a lot of fun trying to figure out who's who and what's happening. So, get an inexpensive Spanish/English dictionary and a map of Mexico, check out some of the frequencies, stay with the strongest signal that can be found, and record two or three radiograms. Go back over the recording a few times picking out units, zones, regions, and city names. Look at the radiogram examples and listen for identifying terminology. I think you'll be surprised at what can be understood or figured out in a short amount of time.

M

Key:  
 MZ MILITARY ZONE  
 MR MILITARY REGION  
 \* MILITARY REGION HQ

MZ	MR	STATE	MZ HQ
01	01	FEDERAL DISTRICT	*MEXICO CITY
02	02	BAJA CALIFORNIA SUR	LA PAZ
03	02	BAJA CALIFORNIA NORTE	MEXICALI
04	03	SONORA	HERMOSILLO
05	03	CHIHUAHUA	CHIHUAHUA
06	04	COAHUILA	SALTILO
07	04	NUEVO LEON	*MONTERREY
08	04	TAMAULIPAS	TAMPICO
09	03	SINALOA	*CULIACAN
10	03	DURANGO	DURANGO
11	05	ZACATECAS	ZACATECAS
12	04	SAN LUIS POTOSI	SAN LUIS POTOSI
13	05	NAYARIT	TEPIC
14	05	AGUASCALIENTES	CALVILLO
15	05	JALISCO	GUADALAJARA
16	..	(GUANAJUATO)	(GUANAJUATO)
17	..	QUERETARO	QUERETARO
18	..	HIDALGO	PACHUCA
19	05	(COLIMA)	(COLIMA)
20	..		
21	..	(MICHOCAN)	(MORELIA)
22	01	MEXICO	TOLUCA
23	08	VERACRUZ	TUXPAN
24	..	(TLAXCALA)	(TLAXCALA)
25	..	PUEBLA	PUEBLA
26	..	(CUERNAVACA)	(MORELOS)
27	09	GUERRERO	IGUALA
28	08	OAXACA	*OAXACA
29	08	VERACRUZ	MINATITLAN
30	09	TABASCO	VILLAHERMOSA
31	09	CHIAPAS	TUXTLA
32	10	YUCATAN	GUTIERREZ
33	10	CAMPECHE	*MERIDA
34	10	QUINTANA ROO	CAMPECHE
35	09	GUERRERO	CHETUMAL
36	07	CHIAPAS	CHILPANCINGO
			TAPACHULA

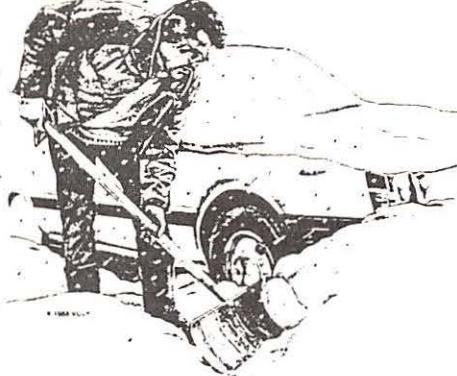
## Frequencies

### MEXICAN ARMY

REGION	FREQS	SUBORDINATE ZONES	ZONE FREQS
01	6817	1,22,24,26	6817/6756
02	6810	2,3	6810
03	5790	4,5,9,10	5475/ 5710/5720
04	5350/6807	6,7,8,12	4600/5495 5500/5590 6800/8819

## Organization

Mexico is organized into military regions and subordinate military zones by the Mexican Armed Forces for purposes of administration. Since all the information shown below was gleaned solely from what was heard on the radiogram nets, some of the locations for the zones and regions in parenthesis are unconfirmed.



# Unexpected Support in a Storm

By Ron Bruckman

**B**ack in the mid and late 70's Citizens Band radio was at its highest peak. People who were in the selling market were making a killing on sales of these eleven meter rigs. It was just a chit-chat thing to a lot of us—just another fad; but some took it quite seriously. Me, I just always enjoyed learning about anything related to radio.

One day I learned the true value of my radio "toy." It was February of 1979, and I was working the night shift as a production mechanic for a local dairy in Baltimore. I had about a thirty seven mile drive one way. That day as I proceeded to work it was snowing very hard and the weather advisory was calling for a lot of snow all day and through the night. Still I was confident that I would have no trouble making my way to work and returning safely to my home twenty.

As the day went on I would occasionally look out the work door and observe the falling and blowing snow. When quitting time finally came around, I was anxious to be on my way. After clearing the snow away from the windows, I turned on my forty channel Sears Road Talker and began the long slow journey north to my home near the Mason Dixon line.

My car was a 1974 Dodge Dart, and it didn't do too badly in the snow. About a foot of snow

had already fallen as I was leaving the Baltimore city limits going into the outer suburbs. The problems didn't arise until I hit the Carroll County line, where the snow was a lot deeper and seemed to be blowing and drifting more than it had to the south.

I finally left the main road and began to travel the old country roads. "I guess we must be getting one of those easterly coastal storms, and it must have stalled," I thought. The weatherman must have been correct on his forecast because it was around 11:00 pm, and the snow seemed to come down harder and harder. I could hardly see out of the front window, but I knew approximately where the road was. I knew there would be a steep grade coming up soon, so I gave the old six cylinder the pedal to the metal.

With my face up to the window to see where I was going, I maintained my speed to make the hill, but I met my match when I plunged into a snow drift. The motor almost cut out; I knew I would have to keep it running so I wouldn't get cold. I also knew I would have to make use of that small investment that I had made in that CB radio. I proceeded to call for help on channel nine, nineteen and some other channels, but no reply.

I then started to worry as the snow just kept

on piling up. There were no homes in the area, and I wasn't about to get out and walk. Meanwhile, the motor tried to stall out a few times as I kept working the gas pedal. I called on the CB again with no response. Finally, I turned the channel selector to channel 28, knowing there were some guys on base stations that I knew personally. I hoped I would be successful.

I called several times and no reply. As I sat there I finally heard a voice saying, "Is that you, Full Choke?" (my CB handle). I sat up in the seat and shouted, "Yes, Green Bug, that's me, and I'm stuck here in a snow drift near my home twenty." He was about twenty miles south of me; his antenna was a moon raker beam which probably helped pull my weak signal in. As he talked to me, other stations close by began to come back to me. One of the fellows told me he would contact a nearby garage.

Well, the tow truck couldn't make it up to me, and I heard him tell the base station that he would contact the local Fire Department. He advised the operator to tell me to sit tight.

I waited for a good while until I heard a noise up under the car. I was unable to see out due to the white stuff all around me, and could only guess at what was happening. One of the firemen yelled at me to turn the CB on and monitor channel nine for further instructions. I waited and he came back to me telling me that they had hooked their winch cable around my rear axle to pull me out of the drift. They kept me updated by radio on what they were doing, as they proceeded to pull me out and unhooked the cable.

It was with great relief that I got turned around and followed them back out to the main road into town where I was finally safe. After thanking them for what they had done, I made a phone call home to my wife telling her about my experience and that I couldn't make it home that night. In fact, I didn't get home for two days after that incident.

After that night, I carried CB's in all my vehicles, and I would advise everyone to have one on the basis of my experience that cold winter night in February. I have a monitoring station with shortwave radios, CB's, scanners and computer equipment. Radio played a very important part in my life, and never again will I underestimate the importance of two-way communications.



Ron Bruckman's well-equipped monitoring post in 1986.

M  
T

# Shortwave Broadcasting

**Glenn Hauser**

Box 1684-MT  
Enid, OK 73702

**DX DAILY** started Feb. 1 for a one-month trial, Monday-Friday 10-10:15 pm CST UTC Tuesday-Saturday 0400-0415 on Radio Miami International, 7395 via WRNO. Thanks to sponsorship of Grove, Universal, C. Crane, and individual donations, your columnist broadcasts shortwave, mediumwave and program monitoring tips with minimum delay. If there is sufficient backing, DX DAILY will be renewed, and if possible moved somewhat earlier. Listen to WORLD OF RADIO for details.

**ALBANIA** Radio Tirana heard with a new interval signal in several variations, replacing *Internationale*, such as before 0230 on 9580 (Tim Hendel, FL, *World of Radio*) Albanian service to Kosovo expanded to 0500-0730 on 7156, 5975 or 5980, 0830-1100 on 6145 (BBC Monitoring)

**ANDAMAN ISLANDS** AIR Port Blair, 4760, at 1230 English news from Delhi, 1237 local news and audible to 1313, way over Kunming, China (David M. Clark, Ont., *Fine Tuning*)

**AUSTRALIA** R. Australia new service to forces in Somalia, 17840-Darwin with RA at 0400-0529, then Australian Armed Forces Radio, Canberra, 2AAFR program weekdays 0530-0600 with messages, recordings. 25750-D experiment 0800-0900 also shifted to 290° (Mike Bird, RNMN)

**AUSTRIA** One week into 1993, *Austrian SW Panorama* came to an end after 18 years, replaced by more airings of *Coffeetable* (gh) For circumstances beyond my control, I had to interrupt producing it (David Hermges, ORF *Mailbag*) Is this permanent? Two years ago listener reaction led to its resumption after another break; check Sunday 2330, Monday 0330 on 9870. Hermges is retiring from ORF; encourage the boss to revive ASWP by writing to: Prof. Paul Lendvai, Radio Austria International, A-1136 Wien (Wolf Harrath, *SW Echo* via Thurman & Baxter)

**AZERBAIJAN** Correct name of English service is Radio Dada Gorgud, after a Turkic epic hero, 1700-1800 on 6175 via Russia (BBCM) R. Baku on 18404, 3rd harmonic of 6135, domestic service at 1216 (Nikolai Rudnev, Russia, *World DX Club Contact*)

**BHUTAN** BBS, 5025, a powerhouse as early as 1250 through English at 1415, audible to closing at 1500 in late December on Beverages, best on westerly one via skewed long path around auroral zone (David M. Clark, Ont., *FT*) UN programs Thurs. 1435; *Bhutan This Week*, Fridays. 1430 (Ron Howard, CA)

**BOLIVIA** R. Nobel, La Paz, 0920-0931 with Amanecer Andino on 2803, harmonic of announced 1400 (Fernando Vilorio, Venezuela?, *The Radio News*) R. Fides, much better on 9625 than 6155 and 4845, clear with local ads, ID at 1100 calling North America (Chuck Bolland, FL) R. Metropolitana, La Paz, new on 6194.51v, at \*0902-0300\*. Radio Pio XII on new 5953.80 ex-5948.69 (Gabriel Ivan Barrera, Argentina, Radio Nederland *Radio-Enlace*)

**BOSNIA-HERCEGOVINA** Of R. Bosnia-Herzegovina's 2265 multi-ethnic employees at the beginning of the war, 945 remained at the end of 1992, and 23 were killed while on duty (RBH via BBCM) Still heard in mid-January on 6219.98 USB around 0400 (Brian Alexander, PA)

**BRAZIL** Deutsche Welle relays here: 2300-0050 Spanish 11810, 0100-0300 German 9640 (*World Radio TV Handbook*)

**CANADA** Ian McFarland returns from Japan in April, to work part-time for RCI. Maybe he can revive *SWL Digest*? (Diane Mauer, WI, *Review of International Broadcasting*) Radio for Peace International plans second SW site at World Peace University campus, Salmon Arm, BC (*Salmon Arm Observer* via Warren Canney, *DX Ontario*) Yes, 50 kW by mid-1994, including native programming and

All times UTC; all frequencies kHz.

\*asterisk before/after time signifies station sign-on/sign-off;

+means continuing but not monitored.

= 2x indicates 2nd harmonic of following frequency

many of the same shows as on RFPI-CR (James Latham, RFPI *Mailbag*)

**CHINA** CRI received 328,000 letters in 1992 from more than 170 countries, a 45-year high, exceeding the 285K in 1965 before the Cultural Revolution when a low 20K was reached (Xinhua via BBCM)

**COLOMBIA** Una Voz en la Frontera, 3040, around 0930, Colombian UTC-4 timechecks, harmonic (Fernando Vilorio, Venezuela?, *The Radio News*) None listed on 1520, maybe only slogan (gh) R. Nueva Vida back on 5570 at 1018, religious talk (Hans Johnson, MD) R. Patria Libre, clandestine on new 5835 at 0043-0114\* (Brian Alexander, PA, *W.O.R.*) Christian Scientists unsurprised 5850

**COSTA RICA** RFPI's new 30-kW transmitter 99% complete in Jan., testing to start in Feb. Check 7375, 7385, 13630, 15030 (RFPI *Mailbag*) See also CANADA above; WORLD OF RADIO, see Feb. *MT*. Spain relay on 4775 at 0500-0600 (Dario Monferini, Italy, *Play-DX*)

**CZECHO** R. Prague retained access to SW transmitters also in Slovakia, q.v. Several English staff resigned after the split, due to heavy stress (BBCM, RNMN)

**ECUADOR** La Voz del Upano, run by Dominican Mothers of Macas, has eight frequencies, 5040 for regular programming, others for education at a distance—1540, 90.5, 3360, 4870, 5020, 5965, 6000; only 15 staff members, modern equipment, 10 studios, each program broadcast morning and evening (Jaime Plaza, *Hoy* via HCJB *DX Partyline*) HCJB retains stock of old QSL cards, list available, and will verify with them on request. UTC-5 expected to resume in Feb. (*DXPL*) R. Runacunapac Yachana, new on 2967.7, at 1004 to as late as 1208 with Andean music, Quechua, populist-liberal-religious station, mentions 1510 kHz in Bolivar province. Seems mistuned to 1484 and radiating mostly on harmonic (Don Moore, IA, *W.O.R.*) Incredibly signal and modulation, most mornings with traditional music, 1030 Spanish ID (Hans Johnson, MD) More harmonics: R. Francisco de Orellana, 2060 = 2x 1030 until 0155\* but carrier stayed on, another night at 0602 but not in mornings. On 3020, unID at 1114-1129, would actually be from 1510 (Don Moore, IA) 3020 IDed here as R. Iris, Quito (Ken MacHarg, *DXPL*)

**EGYPT** Not Baghdad, but R. Cairo on 15209.73-15210.14 in Arabic 1900-2202\* (Brian Alexander, PA, *W.O.R.*)

**FLANDERS** (Belgium) RVI belatedly lowered frequencies in Jan. at 0030 to 7370 N. America, 9930 S. America, improving from inaudible to barely audible (*W.O.R.*) New to Somalia Sundays 1700-1800 on 15540 (Paul Brems, *SW Echo* via Baxter)

**GUATEMALA** La Voz de los Cuchumatanes, Huehuetenango, on 2100 = 2 x 1050 from 1100 past 1212, and at 0042, marimba, tropical, and ranchera music (Don Moore, IA, *W.O.R.*) Good here at 1230 (gh)

**GUYANA** R. Guyana, 5950.39, 0200-0338, best at 0200-0230 in English (M. Molano, Spain and Andrea Lawendel, Italy, *Play-DX*)

**HUNGARY** R. Budapest claimed to be using 15220, 11910, 9835 at 0300-0400 in first quarter, but 15220 normally used and usable, only in summer. Some March topics: *Music and the Birds*, 8th and 13th; *Facing the Faiths*—Buddhists, 4th and 6th, Muslims 30th (via Mike Wager, *R.I.B.*) From Mar. 28 one hour earlier for DST like many other Europeans.

**INDIA** The day BBC, CBC and others were reporting 10 million people fleeing Bombay in a panic, absolutely nothing was said about this on AIR News at 1900 on 11620, totally incredible omission (Allan Garshowitz, BC, *R.I.B.*) Typical policy ignoring domestic disasters.

**INDONESIA** Another new RRI, superb on peaks, 9705 from 0330 past 0400 Jakarta news; registered with ITU as 50 kW Pontianak (Bob Padula, Vic.)

**IRAN** (non) V. of Human Rights and Freedom of Iran, 15620 from \*1630 with ID in English (Craig Seager, *Australian DX News*) 15619.74,

or is it Iraq? Interval Signal (I.S.) maybe same as former Iran's Flag of Freedom (Brian Alexander, PA)

**IRAQ** Even before the U.S. strikes in January, RII, 11860 had English irregularly as early as 0357, as late as 0422 (Norm Blakely, Ont., R.I.B.) See Jan. *MT*, p. 29; 13680 also had English at 2000-2100 New Year's Eve (Bob Padula, Vic.) And at 2200-2300 // 15210 (BBC German DX program via W. Bueschel) S. Asia service in English 1400-1700 heard on 15250 (Michael Kerr, Wales, RNMN) Fair here some days, missing others; 1430-1500 had talks titled *The People and the Leader, Voices Against ---, Cultural Profiles*, with very nice musical interludes; 1500 news but marred by RRI—Romania; 1530 *Iraqi Steadfastness Foils the Enemy* (gh, OK) (non) News Centre of Free Iraq, hostile to Saddam, 2200-2353 in Arabic on 11695 (BBCM) See also KURDISTAN

**ITALY** RAI, 7705.0 USB, domestic Radiouno nocturnal service including 2-minute English news capsules at 0102, 0202, 0302 (Mike Hardester, NC, *DX Daily*)

**JAPAN** R. Japan testing new 7th 300 kW transmitter at Yamata from Jan. until late Feb., 115 minutes each with easy listening music, Japanese IDs every 5-6 minutes toward Asia—01 & 15 on 17765, 03 on 11815, 05 & 21 on 9580, 07 & 19 on 7140, 09 on 6185, 11 & 17 on 15430, 13 & 23 on 21610 (Tooru Yamashita, *R. Japan Media Roundup*)

**KASHMIR AZAD** V. of Independent Kashmir, anti-India, runs about 10 kW for one hour at 0230 on 5000, 5860, 6300; 0700 on 5000, 7300, 7375; 1630 on 4080, 6300; location unknown but address is P.O. Box 102, Muzaffarabad (Nobuyoshi Aoi, Pakistan, RJMR)

**KOREA NORTH** Following a VOA mailbag mentioning many listeners here, jamming started against the 1300-1330 and 2130-2200 broadcasts; also against AWR Guam 1300-1400 on 9650 (Atsushi Osuka and T. Yamashita, RJMR) AWR also 2000-2100 on 11980; VOA at 13 on 17740, 11930, 15195; 2130 on 6130, 7110, 7160, 9755, but not against other external services in Korean (Bill Whitacre, VOA, RNMN) VOA retaliated with megawatt Vladivostok relay on 648 at 1300-1400 amid Moscow programs (Yamashita, Aoki & Kato, RJMR) 648 actually Ussuriysk, 230° (Kim Andrew Elliott, VOA) see RUSSIA

**KOREA SOUTH** (non) R. K'rea is in final stages of negotiating relays via BBC, to improve reception in Europe (RK *SW Feedback*)

**KURDISTAN** V. of the People of Kurdistan, Sulaymaniyah, varies 5880 to 5840, and around 4085 at 0500-0700, 1600-1800 in Kurdish, sometimes adding Turkmen to 1820; and includes V. of Iraq in Arabic at 0540-0600, 1630-1650; on behalf of Patriotic Union of Kurdistan, PUK. (BBCM) Kurdish separatists active in Turkey, PKK—Workers Party of Kurdistan, which previously had small SW station, is about to complete a bigger station to broadcast in Kurdish, Turkish, Arabic (*Gunaydin*, Istanbul, via BBCM)

**MOLDOVA** (non) R. Moldova International announced tests Jan. 6-7 presumably via Romania; 25 minutes each, 1900 France, 1935 Spain on 9620; 0130 Latin America 9755; 0205 USA 7125; 1300 France 15390, 1335 Spain 15285. We heard only the last two (BBCM) 15390 had bad modulation, music overriding voices, interruptions, birdsong music (Eugene, RVI *Radio World*) Another test Jan. 21-22, Thursday into Friday again, 1900 on 7125, 1935 on 9525, 0205 on 7125 (BBCM via RNMN)

**MOZAMBIQUE** R. Moz faces serious problems—obsolete, very old equipment needs to be replaced; first priority goes to MW and provincial transmitters; SW are very weak, can't reach many parts of Africa. FRELIMO members being purged; all parties including RENAMO now get airtime. Head of external service is a Briton, Ian Christie; English news read by him, 1100-1130 on 11820, 11835; 1800-1900 on 4855, 3265 (Eric Beauchemin interviewing Joseph Pembe, RNMN)

**NAMIBIA** NBC on unlisted 4965 in English 0435 past 0500 ID and news (Tim Johnson, IL, RIB)

**NETHERLANDS** (non) RN relays via CIS still hadn't started in late January; delays in shipping digital downlink receiver to Moscow, bad weather delaying fine-tuning dish (RNMN) See last month; revisions—9860 not 9810, and 9845 Alma Ata not 7115 Chita at 1430 (Rocus

de Joode, RN, via Joop Engels, FIDONET *SW Echo* via George Thurman)

**NEW ZEALAND** RNZI plans new 31m frequency from end of DST March 21, TBA (RNZI *Mailbox*) Hope for other dayparts than 0700-1200, when 9700 just fine (gh)

**PAKISTAN** See last month; R. Pakistan slow news at 1625 actually heard only on 13590, 11570, 15550 (Craig Seager, Vic., ADXN) also 17540 (Michelle Thompson, NSW, *ibid.*)

**PERU** Estacion Yurimaguas, Loreto, is new station on 5046.4 at 1200-1300; R. Rioja is also active at same time on 5045.0 (Henrik Klemetz, Bogota, *Play-DX*) Another new one is R. Mundial, Celendin, Cajamarca, on 3871.7 at 2340, before and after 0200, using slogan La Voz de la Esperanza, R. Internacional, Cajamarca, also new on 3402.8 until 0313\*. R. Tayabamba on new 5241.3 at 2250, "una voz Ancashina para el Peru y America" (Cecilia de Salas, *pseud.*, Lima, via G.I. Barrera, RN *Radio-Enlace*) Some towns went to DST, UTC-4 (MacHarg, *DXPL*)

**PORTUGAL** Voice of Orthodoxy (*Golos Provooslavia*) via R. Trans-Europe Sat. 1630-1700 and Sun. 1100-1130 on 9670, Sun. 0500-0530 on 9690; QSLs reports to B.P. 416.08, 75366 Paris Cedex 08, France (Arunas Sillickas, Lithuania)

**RUSSIA** New VOA relays in Chinese: 5925-Novosibirsk, 200kW, 111° at 1400-1600; 5945-Irkutsk, 1000 kW, 152° at 1400-1500; see also KOREA NORTH (Kim Andrew Elliott, VOA, *W.O.R.*) Dr. Gene Scott on KCBI announced his Novosibirsk sked: 1700-0100 6120, 0100-1100 12040, 1130-1600 6070; also might add Krasnodar, Ukraine (Don Moore, IA, *W.O.R.*) 6120 site uncertain, different sked: 1700-2400 there; 0030-1100 12040, 0400-0800 21845, 1130-1600 6070 (S. Aoki, N. Takahashi, *et al.*, RJMR) R. Stantsiya Vostok (East) at 0700-0830 (Sun 0700-0800) on 4610 Komsomolsk, 7210 Khabarovsk, R. Shark not heard on 5780, believed off SW (Nikolai Rudnev, *ADXN*) Moved to 6185, independent station in Ufa, per V. of Russia *DX-Klub* (Y. Kato, RJMR) FEBC on 4060 ex-9560, 0800-1100 Russian, 1100-1200 Korean (T. Yamashita, RJMR)

**SIKKIM** All India Radio, Gangtok, 4775 at 0000-0430 & 1130-1800, 3390 0000-0400 and 1415-1730, including English news 0030. Address: AIR Installation Engineer, old MIA Hostel, Gangtok 737 101 (RIAS *DX Report* via Bueschel, DSWCI *SW News*) Heard 4775 test program, ID and news 0030 (Roland Schulze, Germany, *FT*) Absorbed by India some years ago, but why not still a separate radio country?

**SINGAPORE** R. Japan plans exchange to use BBC relay here to SE Asia, and BBC via Yamata to China (BBCM)

**SVKOKIA** Slovak Radio's foreign service had operated from Prague, with only six people at a branch office in Bratislava. But an external service has been started in Slovakia only, via facilities still shared with R. Prague—0130-0200 on 5930, 7345 to America; 1900-1930 on 9505, 9580 to Europe; also domestic relay 1400-1500 on 9505, 7345, 6055. The 0130 program also announced on 9580 (BBCM) Plans full external service including English (R. Prague via Richard Langley, Internet via Ben Krepp, *FT*)

**SOMALIA** Ali Mahdi Muhammad's R. Mogadishu was heard closing at 1430 on new 9574, instead of 6958, which was still used from 1600 (BBCM) U.S.-backed R. Rajo (Hope), 1480, also testing SW 9540 at 1130-1200 with English IDs; audible only in E. Africa (Richard

## DX Listening Digest

— Much more info in the style of Hauser's column.

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**Glenn Hauser, Box 1684-MT, Enid, OK 73702**

Measham, BBCM, RNMN)

**SPAIN** SNR moved its *DX Spot* back to Sats. after a while on Suns., now UTC Suns. 0015, 0115, 0515 on 9530; and asked listeners whether it should be repeated on another day. Spanish version *Amigos de la Onda Corta*, UTC Suns. 0035 on 6055, claimed 60% of foreign correspondence came from the Arab world (gh) see also COSTA RICA

**SUDAN** Excellent armchair level programming from R. National Unity, 9170, English at 1459-1530, fascinating program with peace messages (Walt Salminiw, Vancouver Island) R. Omdurman, 9170, 1759-1900 in English with anthem, news, commentary, local music. Some days fair, others barely audible (Brian Alexander, PA)

**SWAZILAND** Around longest summer day had many African signals audible midday, "Botswana mode," the direct path being over entirely sunlit southern Indian Ocean, on 6, 7 and 9 MHz bands; the best being TWR at \*0354-0415\* on 6020 (Bob Padula, Melbourne, Vic.)

**SWEDEN** In anticipation of budget cuts later in the year, R. Sweden dropped extra English half-hour to Europe, kept remaining one at 2200 on 6065, 9655, 11995; dropped 15270 at 1600, replaced with new airing at 1830 on 6065, 9655, 15270. Swedish language services may have to become domestic relays only; French and Spanish are in danger, and English duration may be reduced (*Media-Scans*)

**SYRIA** Some R. Damascus programs in English on 12085, or maybe 9950, 15090—Sat. 2130 *Human Rights*; Mon. 2130 *Camera & Masks*; Tue. 2045, *Listeners Overseas*; Wed. 2130 same; Thu. 2145 *Arab Women in Focus* (via Alan Roe, R.I.B.)

**TANZANIA** R. Tanzania uses 10 kW 5050 with horizontal quadrant antenna, English 0330-0430, 0900-1030, 1530-1915; Kiswahili 6105 morn & eve, 7165 afternoon (Betram Matei Kapinga, Engineering, via Alan Roe, W.O.R.)

**THAILAND** I doubt VOA Udon will start before April, maybe later (Dan Ferguson, VOA, *SW Echo* via Baxter)

**TRANS-DNIESTRIA** This Russian ethnic breakaway portion of Moldova has R. Trans-Dniestria heard on 13640 and 15205 at 1900-2000 (Kaj Bredahl Jorgensen, DSWCI *SW News*)

**TURKMENISTAN** National Radio, First Program on new 5015, ex-4825, Turkmen and Russian, Ashgabat from 0100 (BBCM)

**USA** VOA revised Somali frequencies at 0245-0300 to 6155, 7265, 9885, 11965 (Dan Ferguson, VOA, *SW Echo* via Kirk Baxter) Under new management, official U.S. Government positions might be of interest on VOA *Editorials*, but initially just general topics such as press freedom; and one accusing Iran and Iraq of violating chemical-weapons ban; scheduled daily 1455 (actually 1457, best on 9760); 2055 but not on African service; and weeknights 0155 on 5995, 6130, 7405, 9455, 9775, 11580, 15120, 15205 (gh) VOA is looking for engineers experienced with high-power MW and SW transmitters; and technical monitors experienced in monitoring techniques. Applicants must be worldwide available; excellent benefits, EOE, US citizens only. Send SF-171s and inquiries to Jerry Clements, Bureau of Broadcasting, Office of Personnel, Room 1274, 330 Independence Ave. SW, Washington, DC 20547 (Bill Whitacre, VOA, *SW Echo* via George Thurman)

After less than two weeks of regular broadcasting, WEWN, Alabama, closed down due to excessive spurious radiation interfering with nearby VHF police communications and other SW stations. Engineers from Continental were called in to work on the problem; tight-lipped about when WEWN could resume (George Thurman, IL) Last logged here on 13740 Jan. 9 at 1900 ending *Mariology* program; still missing in late January (gh) Resumed Jan. 31, Polish 1300 on 18930 (George Thurman, IL, *DX Daily*) Until 1800 English on 13740; 2000 on 9355, 2200 on 5825; 0100 on 9825, 0300 on 7520, as monitored (gh) Address replacing all others: WEWN, P.O. Box 100234, Birmingham, AL 35210 (W. Glen Tapley, WEWN) America's other Catholic station, KJES, remained silent in late January (gh)

WWCR shifted from 7435 to 12160 in the 0800-1100 period to accommodate new clients such as Melaku Tefera with programming to Africa, Sat. 0800-1000, Fri. 0900-1100, and on 7435 Tue.-Fri. 0645-0700; Saturday includes *Ethiopian Radio*, in Amharic. And *Project Saturn Global*—Satellite University Radio Network decided to add SW via WWCR, testing Mon. and Wed. 0800; may be big client in 0800-1600 period on WWCR #3 from April; commercially-sponsored educational programs. Although *Signals* was getting unscheduled repeat UTC Mons. 0606-0700 on 7435, with better reception than Suns. 0435-0530, it was not guaranteed, so due to poor reception at 0435 and to save production expenses, new editions came out every other week. *Radio Techniques* kept running repeats in Dec. and Jan., Sun. 2300 on 15685, never announcing correct other time of Sun. 0830 on 12160 instead of Tue. 1330 on 15685. *World of Radio* on WWCR: Fri. 2215 on 15685, Sun. 0405 on 7435, 0800 on 12160, (which a listener in Berlin says is much worse than 7435), Mon. 0000 on 7435, Tue. 1230 on 15685; on WRNO, Sat. 2300 and Sun. 0300 on 7355, Sun. 2130 (or 2030, or 2000) on 15420; see also COSTA RICA in Feb. *MT* (gh). 9370 may replace 12160. RTTY on upper side of 7435 traced to NMF, USCG Boston, maladjusted transmitter on LSB, fixed to USB only (George McClinton, WWCR)

Bro. Stair was on WHRI 7315 0100-0500 for two or three weeks in Jan. until LeSea cancelled him for naming non-believers, bashing women, etc. (Diane Mauer, WI, *W.O.R.*)

WYFR celebrates 20 years of broadcasting in 1993; a special QSL card is available (Sheila Hughes, UK, *BDXC Communication*) WRMI, 9955 is under construction; permit deadline to start test broadcasting is May 18; we hope much earlier (Jeff White, RMI) Actual callsign of WFLA's 25870 outlet is KPM-360, per QSL from C.E. Wilson Welch

(Diane Mauer, WI) May have to stop or scale back 25870, not intended for 24h operation, and audio is pre-delay, allowing profanity unbleeped (Dave Sharp, *DXSF* via Hans Johnson, *NASWA Journal*) More broadcast auxiliaries heard on 26150: WLWI-FM, Montgomery, AL at 1805; KXII-TV, ch. 12, Ardmore, OK, at 2255; WMSR, Manchester, TN, at 1645; KWTX-TV, ch. 10, Waco, TX, at 2300 with answering machine loop (Alan Roberts, St. Lambert, PQ, *CIDX Messenger*) Mediumwave harmonics heard in the 1100-1330 period around yearturn: 2220 = 2 x 1110, WKDZ, Cadiz, KY; 2460 = 2 x 1230, WANO, Pineville, KY; 2480 = 2 x 1240, WWZQ, Aberdeen, MS; 2660 = 2 x 1330, KDKO, Tyler, TX; 2720 = 2 x 1360, WMOB, Mobile, AL; 2740 = 2 x 1370, WABD, Fort Campbell, KY; 2800 = 2 x 1400, KWLA, many LA; 2900 = 2 x 1450, WDXR, Paducah, KY; 2920 = 2 x 1460, WBUC, Buckhannon, WV; 2940 = 2 x 1470, KTCB, Malden, MO, sounding like KMAL; also had unID Spanish on 2280 at 1037-1121, maybe not US; see also ECUADOR, GUATEMALA (Don Moore, Davenport, IA) Inspired by Don, I found 2260 = 2 x 1130, KWDS, Prescott Valley, AZ, from 1300; 2580 = 2 x 1290 at 1235, Meridian, MS (gh, OK)

**YEMEN** Sana'a heard at 0325 not only on 9779.8 but in parallel on 9068.77, not a receiver problem (Hans Johnson, MD, *Play-DX*) It's a mixing product with their 300 kW MW on 711 kHz, the separation between the two! (Wolfgang Bueschel, Germany, *Weltenschau*)

**ZAIRE** Informative letter verifying 1987 reception of 15245, from Faustin Mbula, responsible for SW transmitters: Says that 100 kW purchased in 1970 broke down in March 1988 when final failed; also had problem with antenna reflectors and conductors reducing performance drastically; considering purchase of a new 100 kW. Currently have 10 kW on 7205, 6140, 5995 intended for 24 hours service (Mitch Sams, *NASWA, Journal*)

**RAMADAN** which leads to extended night schedules from Moslem countries, runs this year from Feb. 21 to Mar. 23 (Kaj Bredahl Jorgensen, DSWCI *SW News*)

# Broadcast Loggings

Thanks to our contributors — Have you sent in YOUR logs?  
Send to Gayle Van Horn, c/o Monitoring Times.  
English broadcast unless otherwise noted.

## 0030 UTC on 9530

SPAIN: Spanish National Radio. Program feature on the late cellist Pablo Casals. (Bob Fraser, Cohasset, MA) Additional monitoring this frequency at 0532 UTC. (Jim Tabor, Farwell, TX)

## 0035 UTC on 9815

CUBA: Radio Havana Cuba. *World of Stamps* program. Very good signal for this SSB transmission. (Fraser, MA) Havana also audible 0430 on 6180 kHz, 0550 on 9510 kHz. (Tabor, TX) (Gerald R. Brookman, Kenai, AK)

## 0100 UTC on 5995

UNITED STATES: Voice of America. Good signal for VOA ID, and Bill Rogers' interview with People's Progressive Party Leader in Guyana. (Richard A. Jones, Dayton, OH) (Tabor, TX) (Tom Banks, Dallas, TX)

## 0130 UTC on 9590

UNITED KINGDOM: BBC. World news and features. Extended monitoring during the following sessions: 0405 on 5975, 6005, 7325, 9410, 15280, 15310, 21715 kHz; 0615 on 12095, 0639 on 15575 kHz. African service at 1930 on 9410, 12095 15400 kHz. (Brookman, AK)

## 0200 UTC on 4910

HONDURAS: La Voz de la Mosquitia. Spanish. Religious programs in English from World Bible Radio. Station ID at 0233 to *Amazing Grace* hymn and sign-off at 0300. Announcer mentioned the station is back in the jungle and they fly in. The station's power is supplied by a Detroit diesel 20 kW running a generator. (Ed Rausch, Cedar Grove, NJ) *Ed, these people really rough it ... the station receives its fuel by boat from 300 miles away in 60 gallon drums (GVH)*

## 0200 UTC on 9475

EGYPT: Radio Cairo. Fair signal for fifteen minutes of English. Station ID, newscast and local cooking show. (Jones, OH) Additional monitoring in Bengali 17595 kHz at 1250-1407 UTC. Arabic service heard on 15220 kHz at 1606 UTC. (Vladimir G. Titarev, Kremenchug, Poltava Region, Ukraine)

## 0245 UTC on 17835

AUSTRALIA: Radio Australia. Music program to feature previews at 0255. Station ID and news. (Jerry Witham, Keaau, HI) Cricket match monitored on 9580 kHz at 1045 UTC. (Fraser, MA) Additional monitoring at 1651 on 5995/6060/6080 kHz. (Brookman, AK) ABC-Perth heard on 6140 at 1220 UTC with feature on the Simpson Desert, to local news and weather. (Rausch, NJ) (Tabor, TX)

## 0250 UTC on 4800

LESOTHO: Radio Lesotho. Sesotho. Signal carrier to sign-on and national anthem. Partial "Lesotho" ID heard at 0300. Religious music and text to announcer dialogue and regional African music at 0345. (Witham, HI)

## 0300 UTC on 9555

PORUGAL: Excellent signal for English service. Station ID, newscast on Angola and a look back at Spain's Expo '92. (Jones, OH)

## 0305 UTC on 4799.8

GUATEMALA: Radio Buenas Nuevas. Spanish. Devotional at tune-in, choral hymns and station ID. Address for reports to sign-off announcements. Guatemala's La Voz de Nahuala heard on 3360.4 kHz at 1120 UTC. (Banks, TX)

## 0315 UTC on 3300

GUATEMALA: Radio Cultural. Religious program, *The Honor and Glory of God*. Fair reception. (Greg Hathaway, Ann Arbor, MI)

## 0324 UTC on 7190

YEMEN: Yemen Radio & TV Corp. Arabic. Music program of contemporary and regional Arabic. Station ID 0330 to world newscast. (Dave Frenz, Milwaukee, WI) 2101 UTC news, Arabic ID, national anthem and sign-off 2109. (Titarev, Ukraine)

## 0440 UTC on 4914.5

PERU: Radio Cora. Spanish. Program chat to merchant ads and jingles. Nice vocals and ballads to sign-off ID and Peruvian anthem at 0505 UTC. Two other Peruvians logged: Radio Horizonte heard fair quality on 4505 kHz at 0945; Radio Cusco heard on 6194.5 at 1015. Andean flute tune and ID as, "Radio Cusco transmite desde Cusco." (Duane Hadley, St. Petersburg, FL)

## 0445 UTC on 5430

BELARUS: Radio Mahileu. Russian. Continous cheerful choral and folk music presented by lady announcer. Sign-on next day was at 0500 with brief harp melody interval signal. (Witham, HI)

## 0548 UTC on 5960

GERMANY: Deutsche Welle. Good signal for news, IDs and features. (Brookman, AK) African service via Sri Lanka with international news on 11785 kHz at 1910 UTC. (Rausch, NJ) (Tabor, TX)

## 0630 UTC on 7105

CONGO: RDTV-Congolaise. French. Regional newscast to African rhythms, Parallel frequency 9610 kHz audible with weaker overall signal quality. (Frenz, WI)

## 0705 UTC on 9830

CROATIA: Radio Zagreb. Brief English newscast to local music and news

programs in Eastern European languages. (Frenz, WI)

## 1130 UTC on 11925

ECUADOR: HCJB. *Morning Song* start of the day religious feature. Parallel programming heard on 17890 kHz. (Fraser, MA) Ecuador's La Voz Del Upano heard on 5965 kHz at 1020. Station IDs, time check, and popular music dedicated to everyone at Radio Venezuela. (Rausch, NJ) (Tabor, TX)

## 1140 UTC on 17630

GABON: Afrique Numero Un. French. Program *Le Musique Afrique* featuring pop African tunes. ID to program updates. (Rausch, NJ)

## 1150 UTC on 6015

MEXICO: Radio Yucatan. Spanish. Latin pop/rock tunes at tune-in. "Radio Yucatan" ID with time check. Mexico's Radio Mil heard on 6010 kHz at 1235 UTC. News updates, ads and IDs. (Banks, TX)

## 1245 UTC on 15445

BRAZIL: Radiobras. National medical news updates followed by great Brazilian popular music program. (Frenz, WI)

## 1300 UTC on 9560

JORDAN: Radio Jordan. English. International news and commentary, music program with strong signal. (Frenz, WI) Additional English monitoring on 9560 kHz from 1640-1707 UTC. Arabic service noted as; 0538 on 11940 kHz, 0713 on 7155 kHz, 1919 on 7155 kHz, 2114 on 11810 kHz, 2306 on 9560 kHz. (Titarev, Ukraine)

## 1545 UTC on 6250

NORTHKOREA: Radio Pyongyang. Korean. Announcer chat with vibraphone sound effects. Regional Korean music at 1555, followed by time pips and ID at 1600. Lovely music of nationalistic flavor, heard on parallel 6400 kHz. (Witham, HI) (Tabor, TX)

## 1610 UTC on 4119.4

NORTH KOREA: Voice of National Salvation. Korean. Text to local music at 1622 with female voice overs. Music to national anthem and sign-off at 1702. Station heard under bubble jammer which shut down at 1700. (Witham, HI) Nice signal 2225 UTC 3481 kHz parallel 4449 kHz. Lady announcer. Music and talk. (GVH)

## 1630 UTC on 4080

INDIA: (non) Voice of Kashmir Freedom. Pakistani. Frequency drifting to 4079.8 kHz. Carrier at 1615 to sign-on at 1630. Announcements, prayers to talk and music. Male chatter at 1647 with battle field sound effects. Rousing choral music and speeches with reverb at 1700. Programming abruptly commenced mid-music at 1733; carrier on until 1736. (Witham, HI)

## 1645 UTC on 6560

IRAQ: Republic of Iraq Radio. Arabic. Continous music to partial station ID at 1700. Program updates returning to music at 1704. (Witham, HI) 0235 UTC, with Arabic talk, ID and Holy Koran. (Sam Wright, Biloxi, MS)

## 1715 UTC on 6933

CHINA: China Radio Intl. Russian. Newscast to 1723. Conversation to lively Chinese music and ID at 1735. Parallel frequency 6950 kHz. (Witham, HI) Program on China heard on 9655 kHz at 1210 UTC. (Rausch, NJ) (Tabor, TX)

## 1730 UTC on 7115

RUSSIA: Radio Moscow. Russian and American dixieland music as performed by Russian musicians recorded live in concert. ID at 1759 with muffled audio during news at 1800. An enjoyable half-hour. (Witham, HI) Additional Radio Moscow monitoring: 1230 on 11980 kHz, 1645 on 9890 kHz. (Frenz, WI) 1200 on 15210 kHz, 2130 on 9870 kHz. (Fraser, MA) (Tabor, TX) (Brookman, AK)

## 1850 UTC on 15120

NEW ZEALAND: Radio New Zealand Intl. Sign-on with ID, news and features. (Brookman, AK) Audible on 17770 kHz at 0403 UTC. (Tabor, TX) (Titarev, Ukraine) (Frank Hilton, Charleston, SC)

## 2025 UTC on 9435

ISRAEL: Kol Israel. *DX Corner* show featuring a profile on the Satellit 700 by Grundig. (Fraser, MA) (Titarev, Ukraine)

## 2025 UTC on 9840

KUWAIT: Radio Kuwait. Fair signal quality for Arabic and popular music. Station ID and sign-off, parallel 15505 kHz. (Banks, TX)

## 2030 UTC on 7255

NIGERIA: Voice of Nigeria. News and feature programming on life in Nigeria. Drum interval signal to French service at 2056 UTC. (Rausch, NJ) Very weak signal for Radio Nigeria-Enugu 6025 kHz at 2100. Station ID and time into national newscast. (Wright, MS)

## 2159 UTC on 13625

NORTHERN MARIANA ISLANDS: KHBI Saipan. Interval signal to sign-on ID. World newscast into religious programming. (Rausch, NJ)

## 2210 UTC on 6205.5

DOMINICAN REPUBLIC: Radio Estrella. Spanish. Latin pop vocals to canned ID. Reports to P.O. Box 135-2, Santo Domingo. Music and chat continued. Monitored the next day at 2315-2345 UTC. (GVH)

## 2300 UTC on 11965

UNITED ARAB EMIRATES: Radio Abu Dhabi. Arabic/English. Twenty minutes of English programming. *Press Review* show to Holy Koran recitations. (Rausch, NJ) Parallel programming heard this time on 9605 // 11710 kHz. (Jones, OH) (Titarev, Ukraine) (Hilton, SC)

Larry Van Horn

c/o MT, P.O. Box 98  
Brasstown, NC 28902



## CFARS

I got a letter the other day that got my immediate attention—no doubt because it was from publisher Bob Grove.

Bob was asking me if I had identified the callsign 'CIU' heard on the CFARS network channel Lima. Naturally it send me packing into my reference library to try and find an answer. More important, though, Bob's question reminded me that I had not done a write up on CFARS since my first utility column, which was five years ago this month.

Some of you are probably scratching your heads and asking with some irritation, "OK, Larry, what is a CFARS"?

I'm glad you asked. On this special Ute World anniversary month, let's take a look at CFARS: the Canadian Forces Affiliate Radio System.

CFARS is a radio service under the umbrella of the Canadian Armed Forces. In many ways, it parallels our United States Military MARS (Military Affiliate Radio System). Our MARS programs are divided by service (Navy-Marine Corp, Air Force, and Army). Since all the Canadian military is combined into one service, there is only one MARS type service in Canada, CFARS.

Like our MARS services, CFARS has two main purposes. First and foremost, the system exists as a back-up communications network in times of emergency. To provide training for operators, they perform the secondary function of boosting morale—providing phone patches or telephone calls via radio to family and friends for deployed Canadian Forces (CANFORCE) personnel.

Since Canada has its military lumped into one big bunch, expect to hear all sorts of military units on CFARS (i.e.- ships, foreign ground stations, etc). There are three classes of CFARS stations: Military, Coast Guard and Affiliated stations.

**Military stations** operate from a military base or vessel. Most of the callsigns associated with these stations use the prefix 'CIW' and a suffix of one or two digits. Maritime Command ships also use the 'CIW' prefix followed by a four digit suffix, with West Coast ships starting with '2' and East Coast ships starting with '8'. Some CFARS stations apparently use their regular CANFORCE callsign and add a '9' to the suffix for CFARS operations.

Some of the Specialist Military stations use the prefixes 'CIC', 'CIP' and 'CIS'. The 'CHI' prefix is used by some of the Canadian Militia stations. I might add at this point that not all Militia and Specialist use these prefixes.

The second class of station is on larger **Canadian Coast Guard ships**. These ships perform a wide variety of missions including Search and Rescue. Their prefixes also begin with 'CIW'. Suffixes are also four digit like the Maritime Command ships and begin with a '9'.

**Affiliated stations** are those stations operated by licensed Canadian amateur radio operators. Like the hams that operate on US MARS frequencies, these folks handle the messages and phone patches to the folks back home for the personnel deployed. These affiliates also use the 'CIW' prefix followed by three digits in the suffix. The first digit in the suffix will tell you the region or province where the affiliated station is located.

Table 1 is a quick look at the CFARS callsign structure.

CFARS frequencies are most active from 1400 - 2400 UTC. But, as with most utility stations, activity can be heard just about anytime, especially during emergencies. Most stations use the Upper Side Band (USB) mode of communication. CFARS stations can be found on the

Table 1: 'CIW' Callsign Prefix Allocation

Region/Province	Affiliated	Military	Maritime Command Ship
Yukon & NW Territory	CIW 100-199	CIW 10-19	
British Columbia	CIW 200-299	CIW 20-29	CIW 2000-2999
Alberta	CIW 300-399	CIW 30-39	
Saskatchewan	CIW 400-499	CIW 40-49	
Manitoba	CIW 500-599	CIW 50-59	
Ontario	CIW 600-699	CIW 60-69	
Quebec	CIW 700-799	CIW 70-79	
Maritime Provinces	CIW 800-899	CIW 80-89	CIW 8000-8999
Germany		CIW 90-99	CIW 9000-9999
			(CCG)

### Additional CFARS Callsigns

CFC	UN forces in Cambodia
CFT	Station located in Central America
CHI	Some, not all Canadian Militia stations
CHL	UN forces in the Western Sahara
CIB	Bahrain
CIC	Some, not all Canadian Specialist Military stations
CIC9	Canadian Forces Base Calgary, Alberta
CIP	Some, not all Canadian Specialist Military stations
CIP22	Canadian Embassy, Cairo, Egypt
CIP9	Canadian Forces Base Kingston, Ontario
CIP91	Canadian Forces Base Valcartier, Quebec
CIQ	Qatar
CIS	Some, not all Canadian Specialist Military stations
CIS9	Canadian Forces Base Petawawa, Ontario
CIW84	Department of Defence Oromocto, New Brunswick
CIW91	Lahr, Germany
CIW92	Baden, Germany
CIW3100	UN forces in Angola
VDH9	Alert Bay, Northwest Territory
VET9	Damascus, Syria
VEV9	Valcartier, Quebec
VXE9	El Gorah, Egypt
VXN9	Nicosia, Cyprus
VXN91	Ledra Palace, Cyprus
VXV9	Ziouani, Golan Heights, Syria
VXV92	Austrian UN Camp, Golan Heights, Syria

Table 2: CFARS Frequency Allocations

Designator	Frequency	Authorized Station/Area
Alpha (ex-13971)	6977.0	A C D E F G
Bravo	14384.5	A C D E F G H
Charlie	14458.5	A C D E F G
Delta	14461.5	A C D E F G
Echo	14445.0	A C D E F G H
Foxtrot	20970.0	A C D E F G
Golf	20962.0	A C D E F G H
Hotel	29713.5	A C D E F G
Juliette	14452.5	A C F H
Kilo	14448.0	A C F H
Lima	20976.0	A C F H
BC1	4022.0	B C
BC2	4051.0	B C
BC3	6961.0	B C
BC4	6981.0	B C

### Authorized Station/Area Legend

A	All of Canada
B	British Columbia Only
C	Ships at Sea
D	Golan Heights, Syria
E	Cyprus
F	Germany
G	El Gorah, Egypt

frequencies indicated in Table 2.

Well, that about does it for CFARS. If you have some info to update this I would like to hear from you, c/o Monitoring Times. I would also like to thank those of you who have helped me update the US Navy MARS material for the new *Grove Shortwave Directory*. I think most of you will be pleased to see what we have done. Now if we could get some help with the Air Force and, especially, Army MARS, I would be a real happy camper.

Speaking of happy campers, no, I haven't forgotten Bob's original question. I unfortunately don't have an answer. My best guess is that 'CIU' is probably involved with the on-going UN operation in Bosnia-Herzegovinia. I have seen a lot of Canadian Military forces serving in this UN relief effort so they probably have a CFARS station over there. Any others care to take a stab at that call?

## 14648.0 Identified

More information has surfaced on our January report in this column regarding what appeared to be an Air Force packet network on 14648.0 kHz. Steve Pike in Denver reports that 14647.5 kHz was a voice net for the "Inter-American Air Forces Telecommunications System (SITFA)."

"It would not surprise me to learn that they have switched or augmented that net with packet," says Pike. "There are about one score stations involved, mostly in Central and South America."

Norman Talley in West Point, GA, carries the discussion even further. Norman has been monitoring this frequency for some time. He enclosed the following intercept from USAF MARS station AIR (aka AIR1AF-1 on packet), at Andrews AFB, MD. It appears they were using the text below as a test to check out their packet equipment. Unfortunately, Norman only got part of the text due to interference from other stations. Here is that test text from AIR1AF-1:

*"....Andrews Air Force Base (AFA07) and one at Albrook Air Station, Panama. The remaining 16 SITFA stations are located in the capitol cities throughout Central and South America and operated by each country's Air Forces. Our SITFA station in Panama is the main focal point for the entire network.*

*The SITFA network has two circuits, the northern and southern circuits. The following SITFA stations make up each circuit.*

*Northern: Andrews Air Force Base, Colombia, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua (sic-LVH), Panama and Venezuela.*

*Southern: Argentina, Bolivia, Brazil, Chile, Paraguay, Peru and Uruguay.*

*The primary mission of SITFA is to achieve a greater solidarity among the Air Forces of the Americas, and to increase their communications capabilities for hemispheric defense. SITFA provides interconnecting communications channels for all the Air Force Chiefs of Staff, Embassies, Air Attaches and military aircraft of the member countries.*

*All personnel assigned to the SITFA station here at Andrews are bilingual, with Spanish as the primary language used within the system. Our station also provides a great community service for Prince George and Montgomery County Area of Maryland..."*

In addition to the AFA## calls I noted in January, Norman has monitored these callsigns on 14648.3 kHz: LUB01 (probably Buenos Aires, Argentina), ZWU26 (Brazil?), SIT101 (anyone's guess) and AIR1AF, which is the callsign used by AIR to conform to packet protocol standards. The -1 appended to the calls would indicate a packet BBS.

Many thanks to Norman and Steve for updating us on this network. My own personal monitoring at this time seems to indicate that this frequency is probably the southern network. Now I wonder where the northern net is and I also wonder where the rest of the channels are? Thanks, fellas.

## IBA Update

Norman Tally, mentioned in the previous story, also updates us on an Italian station. He has seen in several publications the callsign IBA identified as Italian Navy, Naples, Italy. The location is correct, but the callsign is assigned to headquarters, Allied Forces Southern Europe (NATO). The transmitter site is actually located at Castelvolturno, Italy. The receiver site is at Lago di Patria, Italy.

Thanks again, Norman, for this update. Feel free to drop by the Ute World column often.

## Medium Frequency Coastal Radio Stations

Longtime reporter, Robin Hood in the UK, has provided the following information regarding mediumwave CW Coastal Station activity he has monitored in Europe.

418.0	SVA	Athens	448.0	GLD	Land's End
435.0	7TB	Annaba	448.5	OST	Ostend
435.5	SAA	Karlskrona	449.0	EAS	Cabo Penas
436.0	FFM	Marseille	449.0	OXB	Blaavand
436.5	CUL	Lisbon	458.0	SPB	Stettin
438.0	EAV	Cabo de la Nao	464.0	VCO	Sydney, Canada
438.0	OHC	Helsinki	472.0	EAF	Finisterre
438.0	EAL	Las Palmas	476.0	EAV	Cabo de la Nao
438.0	OXZ	Lyngby	476.0	IQX	Trieste
439.0	OST	Ostend	484.0	4XO	Haifa
439.5	UKG5	Kaliningrad	484.0	EAC	Tarifa
441.0	CNP	Casablanca	489.0	IPA	Ancona
441.0	EAS	Cabo Penas	500.0	PBK	Dutch Coast Guard
441.0	GNI	Niton (FEC Paging)	510.5	GCC	Cullercoats
441.0	3VX	Tunis	510.5	GPK	Portpatrick
442.0	GPK	Portpatrick	510.5	GKR	Wick
442.0	UKS	Riga	511.5	DAN	Norddeich
442.5	FFB	Boulogne	512.5	OXJ	Thorshaven
443.0	9HD	Malta	515.0	EJK	Valentia
443.5	FFU	Brest Le Conquet	515.5	GCC	Cullercoats
444.0	FFB	Boulogne	515.5	SPE	Stettin
444.0	CUB	Madeira	516.5	OXP	Skagen
444.0	ICB	Genoa	517.0	GKR	Wick
444.0	7TO	Oran	518.0	NAVTEX Channel	
444.5	PCH	Scheveningen	520.5	FFU	Brest Le Conquet
447.0	CNW	Tangiers	521.5	SAG	Goteborg
447.0	GNI	Niton	522.0	CTV	Portguese Naval
447.0	ICB	Genoa	522.5	SAE	Tingstade
447.0	SPH	Gdynia	525.0	DAN	Norddeich
447.5	LGQ	Rogaland			

Ships' CW working frequencies noted include:

454.0 465.0 468.0 479.0 480.0 482.0 483.5 487.5 488.0 512.0 kHz

Ships still call on 500 kHz, but are being encouraged to use other specific frequencies. For example, ships wanting to contact PCH Scheveningen Radio are asked to call on 484.5 kHz. Any ships still calling PCH on 500 kHz are answered by Dutch Coast Guard PBK requesting they call PCH on 484.5. Ostend radio has 479.0 as the preferred calling frequency. Most still come up on 500 kHz, though.

A tip of the bow to Mr. Robin Hood and a tip of my hat to you all. Here are your contributions for this month's Utility World logging section.

## Utility Loggings

Abbreviations used in this column

Aero	Aeronautical	FEC-A	One way traffic FEC system
AFTN	Aeronautical Fixed Telecommunications Network	FEMA	Federal Emergency Management Agency
AM	Amplitude Modulation	FF	French Forces
AMVER	Automated mutual assistance vessel rescue system	HF	High Frequency
ARQ-E	Single channel ARQ system	ID	Identification
ARQ-E3	Single channel ARQ ITA3 system	METAR	Code form for routine aviation weather report
ARQ-M2	Multiplex ARQ system with two channels	MFA	Ministry of Foreign Affairs
ARQ-S6	Simplex ARQ system 6 character groups	m/v	Motor Vessel
CANFORCE	Canadian Forces	NDB	Non Directional Beacon
CCG	Canadian Coast Guard	Ops	Operations
CG	Coast Guard	QRM	Interference
CINCLANT	Commander-in-Chief Atlantic	RAF	Royal Air Force
Comms	Communications	Recon	Reconnaissance
CQ	General call for any station	RTTY	Radioteletype
CW	Continuous Wave (Morse Code)	Selcal	Selective Calling
DEA	Drug Enforcement Agency	SITOR-A	Simplex printing over radio code, Mode A
EAM	Emergency Action Message	SLHFB	Single Letter HF Beacon
FCC	Federal Communications Commission	Sovship	Soviet Ship
		Swed-ARQ	Swedish ARQ code
		UK	United Kingdom
		Unid	Unidentified
		US	United States
		USAF	United States Air Force
		USB	Upper Side Band
		VFT	Voice frequency telegraphy

All frequencies in kilohertz (kHz), all times in UTC. All voice transmissions in English unless otherwise noted.

1639.0 C101 CW beacon at 0935. (David Gasque-Orangeburg, SC) *Welcome to the Ute World logging column, David, please report often-LVH.*

1671.0 0W2H2-Fishing drift net with CW ID at 0525. (Gasque-SC)

1686.0 A334-Fishing drift net with CW ID at 0059. (Mike Hardester-NC) EMER-Mercaderes, Colombia NDB in CW at 0924. (Gasque-SC)

2598.0 VCO-CCG Sydney, NS, with High Seas weather at 2200. VCN-CCG Cap Aux Meules, PQ, with High Seas weather at 2235. VOK-CCG-Labrador, NF, with High Seas weather and ice reports at 0150. All in USB. (Ed Rausch-Cedar Grove, NJ)

2760.3 Cuban coastal station giving navigation warnings to unid vessel at 0400 in USB. (Rausch-NJ)

3224.3 Two fisherman talking about their catch and weather conditions at 1130 in USB. (Rausch-NJ)

3485.0 Gander VOLMET with weather in USB at 2350. (Gerlach-Germany)

4028.0 Spanish female 5-digit number station in AM at 0523. (Fernandez-MA)

4149.0 VCWX-Tanker Irving Canada working VCRJ-Tanker Irving Eskimo operators talking about ice in Maritimes in USB at 1310. (Rausch-NJ)

4194.5 C6BF8-m/v Everdina working Portishead Radio in CW at 1908. (Robin Hood-UK)

4545.0 Bravo Echo conducting check-in net with several other LL stations at 0525 in USB. (Fernandez-MA) *Cemetery net, Bill-LVH.*

4675.0 Speedbird 279 (Selcal BDFL) working Shannon from 60N 10W (with Iceland checking) in USB at 1725. (Robin Hood-UK)

4742.0 RAF VOLMET in USB at 0000. (Gerlach-Germany)

4880.0 ULE-Israeli Mossad number station in AM then 5 number groups at 0532 (Wednesday UTC). (Fernandez-MA)

5080.0 Possible US Navy target practice network in USB at various times. (Gill-CA)

5205.0 English female 4-digit number station in AM at 0640. (Fernandez-MA)

5305.7 SLHFB 'D' in CW at 0420. (Fernandez-MA)

5310.0 British and French warships off Yugoslav coast with tactical call signs "7MR" (British) and "0QN" (French) for position checks in USB at 2319. (Robin Hood-UK) Unid station ID'ing as Yankee Papa in USB at 0233. (Hardester-NC) *Now that almost sounds like a Cemetery net station-LVH.*

5395.0 Numerous Mexican stations passing number groups in USB at 1150. (Harry Riddell-Rochester, NY)

5464.0 AP4B-Unid station with CW marker at 0645. Who?? (Fernandez-MA)

6283.0 TCGS-m/v Rauf Bey working Istanbul radio in SITOR-A at 1953. (Robin Hood-UK)

6465.0 UYY-Kaliningrad Radio, Russia, calling UIZC-m/v Pionersk in 50 baud RTTY at 2250. (Robin Hood-UK)

6505.0 English female 4-digit number station in AM at 0130. (Rausch-NJ)

6507.0 VIS-Sydney Radio, Australia, with weather report at 1115 in USB. (Hardester-NC)

6617.0 Riga VOLMET, Russia, with aviation weather in Russian at 0638 followed by Moscow at 0640, Kiev at 0650 and Rostov at 0655 in USB. (Fernandez-MA) *This is the Russian 'A' VOLMET network, have heard them here long path around 1200 UTC in New Orleans-LVH.*

6721.5 L-TAC Base, L-TAC47 and TCO Base in USB at 1540. (Bill Frantz-Thomasville, GA)

6735.0 Hersey (CINCLANT Ops Air Recon) Key West, FL, and several LL stations on a net with radar tracking comms in USB at 0545. (Fernandez-MA)

6741.8 MFA Tunis, Tunisia, with message in French to Brussels Embassy in SITOR-B at 2305. (Robin Hood-UK)

6776.0 T70 working T42 in USB at 0255. (Frantz-GA) *This has also had Scorpion Base on it, would really like to know who these folks are-LVH.*

6790.0 Czech female 5-digit number station in AM at 0412. (Fernandez-MA)

6812.0 Andrews with phone patch from SAM 204 with a USAF General talking about Aurora project to USAF Public relations in USB at 2310. (Steve Gill-Garberville, CA) *I am sure Steve Douglass will have more to say on this-LVH.*

6840.0 Spanish female 4-digit number station in AM at 0232. (Peter Stanwicki-Norman, OK)

7348.0 WGY901 (FEMA) with WGY912, 906 and KCA35 here and on 10493 and 5211 at 1415 in USB. KCA35 is FCC in Belfast, ME. (Frantz-GA)

7435.0 Spanish female 4-digit number station in AM at 0330 under WWCR. (MT reader in Denver, CO) 0315 (Gasque-SC) *Takethat, Radio Free America-LVH.*

7530.0 WNIC426 working NMN-CG Portsmouth in USB at 1050 looking for NMG no answer switched to 11438. (Todd Koch-Bloomington, IL)

7540.0 English female 4-digit number station in AM at 0030. (Rausch-NJ)

7646.5 Engineer working Untouchable in USB at 1355. Also mentioned E4B-E5B. This looks like a Marine Corps administrative channel. (Larry Van Horn-New Orleans, LA)

7831.0 Two unid station setting up RTTY comms. (Fernandez-MA) *Bill, this is W-105 a USAF/FEMA channel-LVH.*

7887.0 English female 5-digit number station in AM at 0424. (Fernandez-MA)

8136.0 Spanish female 5-digit number station in AM at 0615. (Fernandez-MA)

8282.0 6MLB-m/v Pung Yang working St Lys Radio in USB at 2215. (Robin Hood-UK)

8345.0 D5NU-m/v Albertwill working Casablanca Radio in CW at 0833. (Robin Hood-UK)

8353.0 BPKY-m/v Hua Da working Rijeka Radio in CW at 0915. (Robin Hood-UK)

8354.0 4XGI-m/v Galia Carmel working St Lys Radio in CW at 0756. (Robin Hood-UK)

8373.0 IBSF-m/v Lido working Madrid Radio in CW at 0925. (Robin Hood-UK)

8383.5 Y5LC-m/v Fuerstenwalde working Norddeich radio in SITOR-A at 2035. (Robin Hood-UK)

8395.5 LXEN-m/v Helen working Ostend Radio in SITOR-A at 0921. (Robin Hood-UK)

8427.5 PPQ-Serpentiba Radio, Brazil, with SITOR-A idler and CW ID at 0250. (L.Van Horn-LA)

8474.0 JYO-Aqaba Radio, Jordan, with CQ CW marker in VFT QRM at 0630 (weak). (L.Van Horn-LA)

8512.0 DAL-Norddeich Radio working P3FO3-m/v Erato 2 in CW at 0815. (Robin Hood-UK)

8677.0 CBV-Playa Ancha Radio, Chile, with time signals at 0055 to 0100. (Hardester-NC)

8710.0 Roll call of ship names passed to net control in USB at 1250. Ships located in Atlantic. (Riddell-NY) *Marine channel 835, interesting-LVH.*

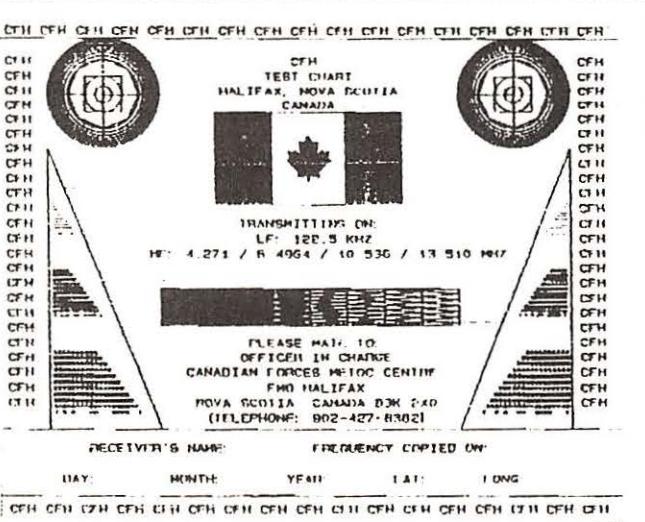
8912.0 Omaha 58 working Longhorn in USB at 1845. Customs XC. (Koch-IL)

9017.0 Belt Fan working Strength shifting to X-903 (this is X-904) in USB at 0004. (Fernandez-MA)

9090.0 English female 3/2-digit number station in AM at 2118. (Fernandez-MA)

9124.0 Spanish female 5-digit number station in AM at 0623. (Fernandez-MA)  
 9195.0 3BZ-Plaisance Air with ARQ-E3 METAR weather codes at 0356. (Robert Hall-RSA)  
 9265.0 MTS-Port Stanley, Falkland Islands, with VFT signal (weak) at 0728. (L.Van Horn-LA)  
 9362.0 German Government Press & Info service with English text of statement by Herr Kohl on Somalia relief. Using 96 baud FEC-A at 1601. (Robin Hood-UK)  
 9983.0 RFFIC-FF Paris, France, with ARQ-E3 idling at 0405. (Hall-RSA)  
 10102.1 RGLI-FF Fort de France, Martinique, with ARQ-E3 idling at 0407. (Hall-RSA)  
 10365.5 RFTJD-FF Libreville, Gabon, with ARQ-E3 idling at 2025. (Hall-RSA)  
 10493.0 WGY901 (FEMA) working KNZ21 with USB radio checks also on F22 and F26. KNZ21 stated they would be further south in 1 1/2 weeks. Who? (Frantz-GA)  
 11052.0 Air Force 2 working Andrews AFB in USB at 1755. (Frantz-GA)  
 11059.0 SAM 29000 working Andrews in USB at 1505. (Frantz-GA)  
 11176.0 Reach 260 (also called Thunderbird 17) with phone patches to Hilda and Thunderbird Ops in USB at 2023. (Paul Roales-Tulsa, OK) Reach 60156 working Andrews in USB at 0130. (Bob Madorin-KS)  
 11217.5 HQ working HR setting up for RTTY in USB at 2010. (Frantz-GA) *RAF/UKADGE channel-LVH.*  
 11220.0 SAM 204 working Andrews on S-310 in USB at 2035. Also test on 6817 and 13211. (Frantz-GA)  
 11228.0 Shadow 67 (aircraft) and Blackcat trying to establish comms on 'Golf'. They both tried Echo frequency several times with no luck in USB at 1836. (Fernandez-MA) *Another interesting log, Bill-LVH.*  
 11243.0 Offutt AFB working Gold 88 (KC-135R) in USB at 1410. Said this was 112 Upper. (Charles Kling-Outremont, PQ)  
 11267.0 Offutt AFB on with an EAM then at 1850 'C9L' on with a EAM. Is this another GHFS channel? (Fernandez-MA) *Still US Navy Bill; remember, Offutt is STRATCOM headquarters over all strategic forces. Interesting log-LVH.*  
 11288.0 Rockwell Intl conducting a flight test in USB at 1744. (George Coombs-Henderson, KY)  
 11413.0 SAM 6021 working Keesler Metro cia Andrews in USB at 2001. (Fernandez-MA)  
 12425.0 CLBY-m/v Maisi working Ostend Radio in CW at 1100. (Robin Hood-UK)  
 12447.0 C6HP5-m/v MC Coral working St Lys Radio in CW at 1533. (Robin Hood-UK)  
 12462.0 5BRG-m/v Seahappy with AMVER msg to Portishead Radio in CW at 1550. (Robin Hood-UK)  
 13092.0 WOM-AT&T Ft. Lauderdale, FL, working NWHS-USS Standley (12245) with phone patch in USB at 2145. Standley off Somalia coast. (Rausch-NJ)

13231.0 CANFORCE VOLMET Lahr, Germany, in USB at 1516. (Gerlach-Germany)  
 13900.0 Ashley 12 working Aria 15 in USB at 1125. (Koch-IL)  
 13907.0 Omaha 53 working Slingshot in USB at 1040. Customs. (Koch-IL)  
 14481.9 RFTJ-FF Dakar, Senegal, with ARQ-E3 Code de Voie at 0750. RFFAW-Guerre D'Orléans Paris to RFLIGD-Cayenne and others at 0755 using ARQ-E3. (Hall-RSA)  
 14686.0 Flint 560 working Jaguar 450 in USB at 1612. DEA Papa. (Koch-IL)  
 14703.0 English female 3/2-digit number station at 1603 in AM. (Hall-RSA)  
 14937.5 TTL-AFTN N'Djamena, Chad, using ARQ-M2 channel A with weather codes and aero traffic at 1510. (Hall-RSA)  
 14943.7 MFA Cairo, Egypt with SITOR-A traffic in Arabic at 0618. (Hall-RSA)  
 14959.9 RGLI-FF Fort de France, Martinique, with ARQ-E3 idling at 0615. (Hall-RSA)  
 15015.0 Reach 1121 working Ascension GHFS in USB at 2105. (Jeff Multer-Charlotte, NC)  
 15035.0 CANFORCE VOLMET Lahr, Germany, in USB at 1240. (Gerlach-Germany)  
 15046.0 United 911 working United Dispatch via phone patch from Berne radio in USB. (Rausch-NJ)  
 15647.6 RFTJ-FF Port Bouet, Côte d'Ivoire, working RFFABCR-Paris with ARQ-E3 five letters groups at 1338. (Hall-RSA)  
 15867.0 Omaha 67 working Slingshot in USB at 0955. (Koch-IL)  
 16013.8 RFVI-FF Le Port, Réunion, with ARQ-E3 idling at 1223. (Hall-RSA)  
 16086.0 English female 3/2-digit number station in AM at 1218. (Hall-RSA)  
 17194.4 PPR-Rio de Janeiro Radio, Brazil, with time pips at 2130. (Fernandez-MA)  
 18171.0 Flint 431 working Atlas in USB at 1420. DEA Sierra India. (Koch-IL)  
 18594.0 Omaha 63 working Hammer in USB at 1252. Customs VC. (Koch-IL)  
 20419.4 DMK-MFA Bonn, Germany, using ARQ-E sending, "Kathleen ist nebrigens gut" at 1132. (Hall-RSA)  
 20421.4 German Embassy Luanda, Angola, with crypto ARQ-E for Bonn at 1026. (Hall-RSA)  
 20421.7 DMK-MFA Bonn, Germany, to Luanda Embassy with "OK IM MM Nichts" using ARQ-E at 1011. (Hall-RSA)  
 20422.5 DMK-MFA Bonn, Germany, with ARQ-E messages in German for Accra "Station Patrick" at 1142. (Hall-RSA)  
 20716.9 RFFXI-COMELEF Bangui, Central African Republic, working Mislog Douala in French at 0822 using ARQ-E3. (Hall-RSA)  
 20750.1 OEC-MFA Vienna, Austria, with crypto using ARQ-S (S6 mode) at 0955. (Hall-RSA)  
 20830.2 RFGW-FF Paris? with crypto using FEC-A at 1106. (Hall-RSA) *Robert, wonder if this is not MFA Bonn. I can't remember getting a FF using FEC-A but Bonn is using that mode-LVH.*  
 20890.0 Ballyhoo 506 working Sunshine in USB at 1601. Customs. (Koch-IL)  
 22330.5 D3E81-Luanda Radio, Angola with CW V marker at 1825. (Rausch-NJ)  
 22353.6 UICP-Sovship "8-0708" working Murmansk at 1142 using 50 baud RTTY. (Hall-RSA) *Robert, believe this one is the Ishevsk-LVH.*  
 22354.5 LYHJ-Sovship TB Bereg Yunost working Kaliningrad at 1155. LYGF-Sovship Kapitan Sukhondyayevsky working Kaliningrad at 1215. Both using 50 baud RTTY. (Hall-RSA)  
 22354.6 EVUW-Sovship BST Tiora working Kaliningrad at 1210. USXE-Sovship Batsplunge working Kaliningrad at 1146. UJMO-Sovship TR Karl Linne working Kaliningrad at 1140. All using 50 baud RTTY. (Hall-RSA)  
 22355.1 ESET-Sovship TR Yatsenyavich working Klaipeda with 50 baud RTTY at 1158. (Hall-RSA)  
 22356.6 UWNX-Sovship RTMS Zefir with Kaliningrad, often logged with 50 baud RTTY at 1144. (Hall-RSA)  
 22361.8 UDTI-Sovship Sovetskaya Ukraina working Ilchevsk at 1240 using 50 baud RTTY. (Hall-RSA)  
 22364.1 UFEH-Sovship Fedor Petrov working Vladivostok at 1150 using 50 baud RTTY. (Hall-RSA)  
 22395.0 KPH-San Francisco Radio, CA, with SITOR-A idler at 2205. (Fernandez-MA)  
 22857.7 RFHI-FF Noumea, New Caledonia, with ARQ-E3 idling at 1022. (Hall-RSA)  
 22904.3 DMK-MFA Bonn, Germany, with FEC-A idling at 1505. (Hall-RSA)  
 22905.4 DMK-MFA Bonn, Germany, with FEC-A idling at 1502. (Hall-RSA)  
 22905.7 DMK-MFA Bonn, Germany, with FEC-A working German Embassies in Pretoria, Maseru, JNB, CPT, DBN at 1226. (Hall-RSA)  
 22962.8 German Police Net-Bielefeld with ARQ-E idling at 1457. (Hall-RSA)  
 23407.0 Silver 12 passing coded messages in USB at 1020. (Koch-IL)  
 23586.1 SAM-MFA Stockholm, Sweden, with garbled traffic using the Swed-ARQ mode at 1323. (Hall-RSA)  
 24297.9 German Police Net-Düsseldorf with ARQ-E idling at 1442. (Hall-RSA)  
 25870.0 WFLA-AM 970 Tampa, FL, with auxiliary transmitter in FM mode at 0120. Carrying sports program relay, best via USB. (Hardester-NC) *This one is being widely heard nationwide.-LVH*



Fax received by Clifford Nadiger  
of Copperas Cove, TX.

# The Scanning Report



Bob Kay

## Inside 911

To open the solid, metal door, a special code must be entered into an electric cipher lock. Beyond the door, there is

a large, windowless cubical that resembles a bomb shelter. Inside the room, there's an automatic fire extinguishing system, a back-up power system and more than a dozen computer screens.

The room is officially referred to as a "Public Safety Answering Point (PSAP)." You and I know it as "911." If your town has installed an emergency 911 system, there's probably a PSAP located within 50 miles of your home. The typical location for a PSAP is in the basement of a building that is owned or operated by your state government. In rural areas, PSAP's can be a considerable distance from the location of the caller. The 911 caller usually thinks that he or she is talking to someone in their local police department. Few people realize that dialing 911 may actually be a long distance call.

Here's what actually happens when 911 is dialed. Instead of going straight to the local police, 911 calls are automatically channeled through a "tandem." The tandem contains a computer that uses the caller's phone number to determine the address. The call is then forwarded to the appropriate PSAP, all in a matter of seconds.

When the PSAP receives the call, the caller's name, address and phone number is displayed on a computer screen. The ability to match a phone number with an address is referred to as "Automatic Number/Automatic Location System (ANI/ALI)." It should be noted however, that ANI/ALI capability may not be installed at every PSAP location. After displaying the caller's phone number and address on the screen, the computer instantly identifies the nearest police or fire department that provides service to the location of the calling party.

Depending on the coverage area, a PSAP center will have at least three people on duty, around the clock. In large metropolitan areas, such as New York City, there could be a dozen people taking incoming calls. The average number of calls per day is approximately six hundred. The actual number of calls depends upon the amount of disturbances such as fights, domestic quarrels, loud parties and other problems. During holidays and inclement weather, the number of calls will increase dramatically.

Training to become a PSAP Dispatcher can take about a year. It requires classroom training and many hours of on the job training. In some locations, PSAP centers are an independent organization. The civilian employees of independent PSAP centers have no affiliation with local law enforcement or fire departments.

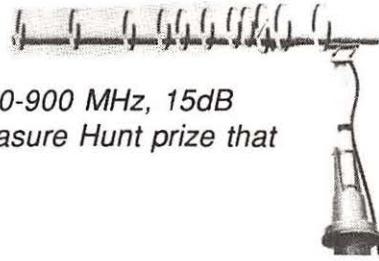
Dispatched calls to police and fire departments can be sent out on single or multi-channels. And as we all know, 911 calls can also be tied into an 800 megahertz trunked system. Calls can also be dispatched by a system called "Computer Aided Dispatch (CAD)." The CAD system utilizes a computer that can receive and dispatch routine information. A police officer can perform a vehicle check by merely punching in the license plate number on his computer. The main computer receives the information via the airways and returns the data to the patrol car in the same manner. The entire process only takes a few minutes and it does not require a dispatcher.

At this point, I know what you're thinking. Can the CAD signal between the patrol car and base be monitored? As of this writing, no one has successfully decoded a CAD signal. The transmission is sent in bursts, and no two systems utilize the same protocol. To decipher the

information, you would need a computer system identical to the units that are used by your local police department.

The frequencies used for CAD dispatch are usually the same frequencies that are used to dispatch your local police. A CAD frequency can be easily identified by a myriad of strange sounds, beeps and whirs. When the CAD frequency is located, place it in the lock-out mode. Don't forget however, that the CAD frequency can change on a daily basis. If you forget to unlock the old frequency, you'll miss part of the action.

As I've already mentioned, there's probably a PSAP center within an hour's drive of your location. If you call ahead, it may be possible to visit the center and take some pictures as well. And if you really want to get in on the action, consider applying for a dispatcher position. Your experience as a scanner hobbyist will be a definite plus on your application.



*The MAX System 800-900 MHz, 15dB Loop Yagi is the Treasure Hunt prize that you can win.*

## Treasure Hunt

If you're a serious 800 megahertz listener, you need the 11 element, loop Yagi, beam antenna from MAX System Antennas. The antenna features 11 elements and can be mounted in a fixed location or rotated with a standard TV antenna rotor.

The loop Yagi is a professionally crafted 800 to 900 megahertz antenna that is approximately 36" long x 7" wide. The antenna features high gain in a compact and lightweight package. To win the MAX System, 800 MHz loop Yagi, here are the clues:

1. When two antennas are mounted in the same vertical plane, they should be placed at least one-half wavelength apart. True or False?
2. Explain the abbreviation: "CMRS"
3. Use the January 93 issue of *MT* and provide the 800 number for MAX System Antennas.
4. Radio waves travel at the speed of light. True or False?
5. Provide the frequency spread for television channel 80.

The loop Yagi retails for \$75.00 dollars plus \$4.00 dollars for shipping. To provide you with the best possible signal, the Yagi features a rear mounted, type "N" connector. MAX System Antennas will also supply coax cables with factory installed connectors. For more information contact: Cellular Security Group, 4 Gerring Road, Gloucester, Massachusetts 01930, (508) 281-8892.

## Frequency Exchange

Is everybody ready? Okay, "hook on" and after your main chute deploys, don't forget to deactivate your reserve chute. Welcome to parachute jumping in *Apollo, Wisconsin!*

According to Roger West, the state of Wisconsin has more than a dozen "jump sites." Here are the locations that are commonly used by "jump pilots."

Apollo--South of Superior	Menamanee Falls
Baldwin	Osceolla--3 miles S.E. of the airport
Chippewa Falls	Oshkosh
East Troy	Pulaski
Lake Dehton	Shiocton
Lancaster	Superior
Marshall	

The frequencies that are used by Wisconsin jump pilots are: 122.750, 123.400, 123.450 and 123.500 MHz.

Ready for our next stop? Relax. You won't need a parachute. Let's take a bus ride to **Kansas City, Missouri**. An anonymous contributor wants everyone to know that Kansas City has contracted with Ericsson General Electric, for installation of a 10.5 million dollar trunked radio system. The system is expected to be operational by the summer of 1993. The frequencies will be:

811.2125	812.2125	813.2125	814.2375	815.2375
811.2375	812.2375	813.2375	814.2625	815.2625
811.2625	812.2625	813.2625	814.4375	815.4375
811.4375	812.4375	813.4375	815.2125	

Another anonymous reader has invited us to visit **Genesee County, Michigan**.

153.90 Flint City Fire	155.15 Goodrich Ambulance
154.515 Genesee EMS	155.205 Grand Blanc Ambulance
154.20 Argentine Fire	155.445 Genesee Sheriff

Michigan residents are invited to expand the list by sending in your favorite frequencies to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28532.

To get to our next stop, we'll need another airplane. But don't get excited—we won't jump out until the wheels touch the ground. Our destination is the home of Stephen Welms, in **Dartmouth, Nova Scotia**. Stephen has provided a two page list of area frequencies:

<u>Air Frequencies</u>	<u>Other areas of interest:</u>
119.200 Terminal arrival/departure	412.062 Dartmouth fire
118.700 Arrival secondary	412.162 Bedford Police
121.900 Ground	412.362 Dartmouth Police
128.900 Air Nova operations	412.562 Dartmouth Police
129.100 KLM operations	412.862 Dartmouth Police
130.170 Air Canada	464.287 Bedford place security
130.500 Air Atlantic operations	468.837 Metro Center, event
460.700 Air Canada ramp	481.837 Park Lane, security
462.425 Air Canada sales	
465.000 KLM sales	
463.962 Cara food service (Flight kitchen)	
464.712 Hudson General, ramps	
464.262 Hudson General	

If you want Stephen's complete two page list of frequencies, send \$2.00 dollars and a #10 SASE to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902. In addition to sending the two page list, I'll also send you an "Air Canada National Route Planning Chart." The chart is packed with flight information and frequencies for Greenland, Iceland, Gander and many other locations.

As we return to the United States, our first stop will be **Anoka County, Massachusetts**. David Engelman lives nearby and here is Dave's list:

460.275 Mercy Hospital
464.775 Northtown shopping center security
460.050 Dispatch, St. Paul Police
460.150 Dispatch, St. Paul Police
460.225 St. Paul Police, special events

## GUIDE TO UTILITY STATIONS 1993

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460.425	St. Paul Police
460.450	St. Paul Police
810.4875	Anoka Park Rangers
855.4875	Anoka Park Rangers

Since we're already in the neighborhood, let's visit with Raymond Haddigan, of **West Lebanon, New Hampshire**. Dave has invited us to listen to a few of his favorite frequencies.

151.145	Vermont Forestry/Parks fire
154.400	Twin state mutual aid fire
155.910	New Hampshire State Police
156.090	New Hampshire State Police
159.195	Highway Dept., Vermont
159.405	Fish & Game, Vermont
453.775	Highway Dept., New Hampshire
453.975	Highway Dept., New Hampshire
460.275	Vermont State Police (Windsor-Woodstock)
460.425	Vermont State Police (Bethel)
460.475	Vermont State Police (Ascutney)
465.025	Vermont State Police (Windsor)

Our last stop this month will be the town of **Washington D.C.** Mark Garland monitors the news media and here are his favorite targets.

153.110	WKMZ radio remotes	450.2875 92Q Headline news
153.230	WKMZ radio remotes	450.4125 ABC
161.730	Fox TV Base	450.5875 ABC couriers
450.0375	WBAL Desk	450.6125 CBS TV IFB
450.1375	WBAL audio feed	450.9125 Metro Traffic
450.1625	WBAL	455.0875 ABC News Desk
450.2125	WUSA TV Desk	455.2125 WMAL News
450.2625	WMZQ Air watch	455.350 WCBM B-more radio

Do you have some interesting frequencies that you would like to share with other *MT* readers? Send your frequency invitations to the Frequency Exchange, P.O. Box 98, Brasstown, NC 28902. All requests for anonymity will be granted.

## Computer Corner

Are you using a shareware program to store and sort frequencies? If so, send me a copy and I'll offer it to *MT* readers. My favorite program is "Radiolog." It's easy to understand and you won't need to read twenty pages of instructions. The average person can load the program and master it within fifteen minutes.

Radiolog is free for the asking. Send a formatted 5-1/4 disk with a mailer and return postage to Bob Kay, P.O. Box 173, Prospect Park, PA 19076. An easier route is to simply mail \$3.00 dollars to the same address. I'll supply the disk, copy the program and provide the postage and mailer.

The choice is yours, but you should hurry. This offer will end on May 1. Requests that are postmarked after this date will be returned.

## Chicken Man

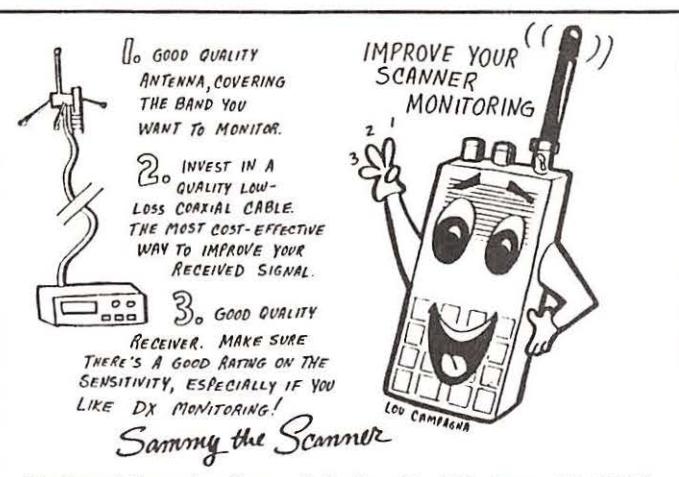
A radio pirate in Windsor, Ontario, interrupts police transmissions by clucking like a chicken. The Ontario Police say that the clucking starts around 7 a.m. and disrupts routine police calls. Police say that Chicken Man is probably using a stolen police radio. (News clipping from the Hudson Press.)

## Wireless Microphones

Gene Hughes, publisher of *Police Call*, says that the following frequencies are specifically allocated for wireless microphones: 169.445, 169.505, 170.245, 170.305, 171.045, 171.105, 171.845 and 171.905. According to Gene, 33.40 is not designated as a wireless microphone frequency, but since it is limited to 1/2 watt, it has few other uses.

## Anonymity on 911

Our high tech world has nearly eliminated the ability for a citizen to anonymously call the police. As I mentioned in my opening story, the caller's name, address and phone number is automatically displayed on the 911 computer screen. Gone are the days of calling your police department with a hot tip, and then hanging up.



Northeast Scanning News, P.O. Box 62, Gibbstown, NJ 08027

Some folks are actually hesitating to call the police. One reader wrote to me and expressed his outrage when the police asked him to identify a suspected car thief. "Since I was the 911 caller, the police asked me to appear in court and testify as to what I saw."

Calling 911 and remaining anonymous is not impossible. All you need is a portable cellular phone. Calls made through a cellular network cannot be identified by 911 emergency computers. So keep your portable cellular phone on the night stand. A cellular phone in your home will allow you to call 911 with complete anonymity.

## Radar Detector

Radar detectors in commercial trucks and busses are banned in the state of Illinois. As of January 1, 1993, the state joins New York in penalizing radar use in commercial vehicles. The Illinois restrictions carry a \$50.00 dollar penalty for the first offense and \$100.00 dollar penalties for repeat offenses.

## Radio Suit

The widow of a slain Charlotte, North Carolina, Police officer is suing the city and Motorola. The suit claims that the Motorola radio malfunctioned and contributed to the officer's death.

Police officers complained about the malfunctioning emergency button on Motorola radios prior to the incident. The city of Charlotte was using an 800 megahertz trunked system when the officer was shot.

## Civilians vs. Police Revisited

In the December 1992 issue, I mentioned that the president of the Patrolmen's Union in Lawrence, Massachusetts, was fighting to prevent civilians from becoming police dispatchers. The president doesn't believe that civilians would be able to manage the computer system or properly respond to emergency situations.

Your responses to that issue were emotional, sometimes nasty, and evenly divided. For each letter that favored using civilian dispatchers, there was another that opposed the idea. Here are a few of the comments that were sent in:

• "Police officers and their unions will always claim that civilians cannot handle the rigors of a dispatch assignment—that's nothing more than hogwash!"

• "Mr. Kay, you are an #!#!&\*!. Civilians should never be permitted to dispatch police radio."

• "Police officers are civilians. If not, when did they join the military?"

As I mentioned in my opening story, PSAP's are often manned by dispatchers who have no affiliation with local police. Those opposed to the idea claim that a sworn police officer should be sitting behind the dispatch microphone. Supporters of private dispatchers claim that any individual, who has been properly trained, can dispatch police calls.

So once again, I'm asking for your response. And if you're especially willing to stir the caldron, here's an additional question to consider: "Who makes the better dispatcher—a man or a woman?" Send your comments and opinions to the Scanning Report, P.O. Box 98, Brasstown, NC 28902.

See you guys next month.



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## Getting Grounded

One of the most commonly used, but most misunderstood, radio features is the lowly GROUND connection. Some modern radio pundits even write that the traditional ground connection is as useless as the human appendix and needs to be relegated to antiquity along with spark gaps and tubes. Most of us, if we have read our manuals, dutifully connect a piece of wire to a cold water pipe or a ground stake and trust in the radio gods that we have done the right thing. Knowing what that ground connection does will show you how it helps your receiver's performance and how it can even serve to save your life!

Modern household electric systems have a ground connection built in. That big hole below the two vertical narrow slots in most wall sockets is the ground connection for your home's wiring. This ground connection is an important safety feature. If a household appliance was to short out, this ground connection gives the stray electricity a safe path to travel. If you were using a device that did not take advantage of this grounding process, and its case became "hot," the stray electricity may use YOU for the path that it will travel. So protection against electrical shock hazards is the first and foremost use for a ground connection.

An important safety note: Before you go assuming that the third hole on your wall socket is a true ground connection, have your system examined by a competent electrician. Older houses often have a hodgepodge of wiring. Sometimes modern sockets are improperly installed in older "two-wire" household systems. In other words, the ground connection may be no connection at all. This is important not only for safety, it may be required to meet building, fire and insurance codes.

If you have been reading through books on electrical theory, you may come across the term GROUND POTENTIAL. What this means is

that any point in a circuit that is at ground potential could be put into electrical contact with a ground stake or a cold water pipe ground connection without disturbing the function of the circuit. These would be those points in the circuit where there is zero voltage, the same as the real earth.

Just as water always seeks its lowest level, electricity tends to flow toward ground or ground potential. This is the reason for the safety feature of a ground connection in household wiring. Usually the chassis and portions of a receiver's circuit boards are designed to be at ground potential. On schematic diagrams you will see ground potential indicated by the symbol for chassis ground and true earth ground represented by the symbol for earth ground (FIG. 1).

Here is where some radio theorists disregard the true earth ground connection on receivers. These thinkers feel that modern circuits attain sufficient ground connection through the third prong on the receiver's power plug. Most engineers designing modern equipment still feel that a true earth ground connection is of use and insist on the connection to assure best receiver performance. Let's try to get a handle on how a true earth ground connection works in a receiver's circuit.

Think of the most basic radio receiver in the world, the simple crystal detector (FIG. 2). Radio waves travel through the air and are captured by the receiver's antenna. If you look at a crystal radio circuit, this is a direct connection through a coil of wire to a true earth ground. Remember how we discussed earlier how electricity seeks a path to ground or ground potential? In this case, the electromagnetic waves travel down the antenna but are tapped and detected by the crystal set on their way to ground.

All receivers perform this task of tapping into signals on their way to ground. More sophisticated receivers just do more with the signal

when they access it. While the third prong of your receiver's power plug will provide a path to ground, it is a path that runs throughout your house wiring and is likely to pick up induced noise from the other electrical devices operating in your household. I think the reason the true earth ground connection remains part of radio design is a desire to achieve the best possible ground connection to improve detection and signal to noise ratio.

### Solid Ground in a Salt Marsh

The reason why some people do not notice any improvement in their receiver's signal when they make a true earth ground connection is the very earth under our feet. Not all ground is created equal. Variations in GROUND CONDUCTIVITY from one location to the next can be drastic. Ground conductivity is a function of soil composition and moisture content. If you could drive a ground stake into solid rock in the middle of the driest desert it would have the same effect as not even making the connection. On the other hand, a ground stake sunk into a salt marsh would represent excellent ground conductivity.

Transmitting antennas, which depend on their relationship with the ground to assure efficiency, are often designed over large grids of wire buried beneath the surface to assure excellent ground characteristics. Your area's ground conductivity is usually a known quantity; you can check with your township engineer.

If you are constructing your own outside ground connection, you can take a few steps to improve your ground conductivity. You can use multiple ground stakes of the type sold through electronics stores. Clamp all the rods to each other with short straight runs of #8 gauge aluminum wire. Radio Shack carries an 8 foot ground rod with clamp part number 15-529 \$15.95.

You can achieve the same results by buying a more inexpensive length of thick walled 3/4 inch copper pipe at your local plumbing supplies store. To drive the pipe into the ground you simply have to flatten one end into a sharp point. If your soil is a bit hard, instead of flattening one end, you can hook a garden hose up to the top end and use water pressure to "drill" the pipe into the ground.

Common hose clamps are excellent for connecting your ground lead to your ground stake. Ground conductivity can be improved further by digging a shallow hole around your ground stake and filling it with rock salt (FIG. 3). If the location of your ground stake is not regularly moistened by local rain patterns, toss a bucket of water into the hole every week or so.

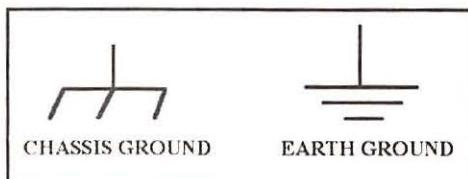


Figure 1

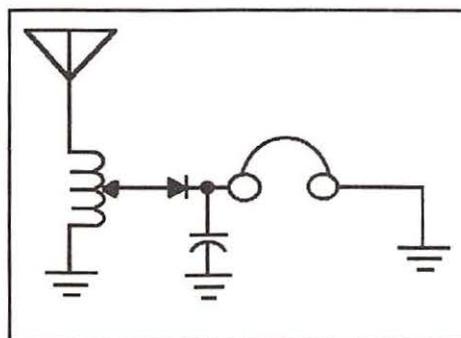


Figure 2

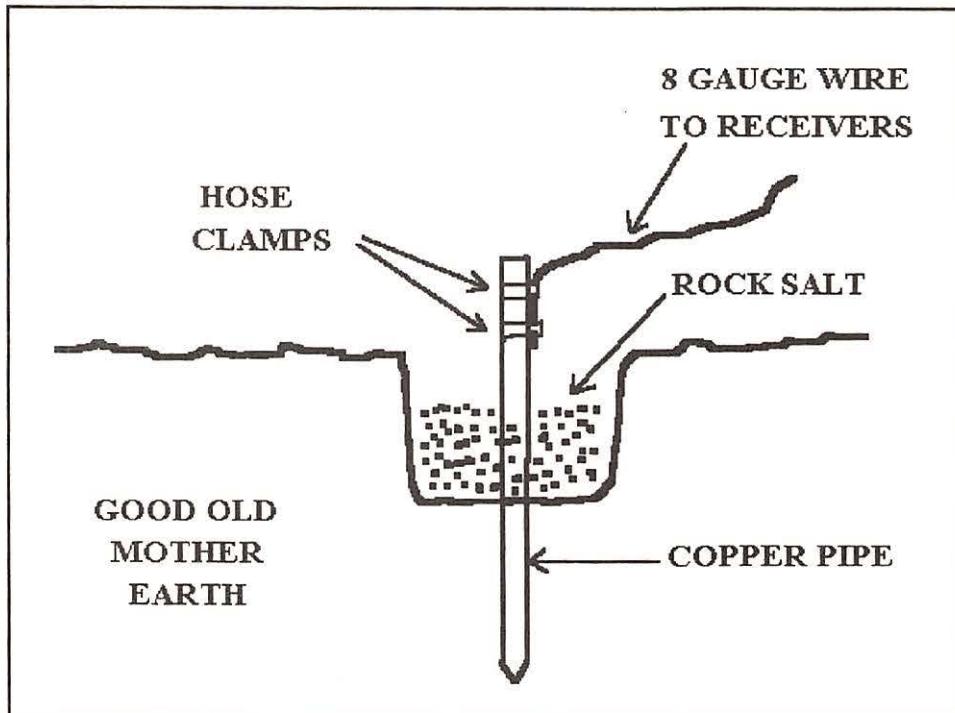


Figure 3

The lead in to the ground connection on your receiver should be made of at least #8 gauge aluminum wire. The wire run should be as short and straight as your situation allows. Once you have your true earth ground connected, you should periodically check all connections for corrosion or loosening.

### Alternatives

What if your location does not permit an outside ground connection? Your first choice is to make your ground connection to the household copper COLD water pipe. Once again, use hose clamps or a ground clamp (available at most TV and radio supply stores). Make sure the pipe is clean and free from corrosion. It is also very important that you check to make sure the pipe is copper all the way out into the ground. Many new houses and apartments utilize PVC piping and plastic fittings around water meters. You can work around these plastic places by clamping #8 gauge aluminum wire to bridge these non-conductive gaps in your ground system.

You may be wondering why I am harping so much on the recommended size of the ground wire. The reason why #8 gauge wire is usually used is that it is a size or two larger than all the other wires that are commonly used in a household. If there is a power surge, short or static charge from a nearby thunderstorm, you want a path of least resistance to ground. Electricity is basically lazy. If it has the choice of traveling down a great big #8 gauge wire instead of squeezing through a more common #12 gauge house wire, it will go for the bigger wire every time.

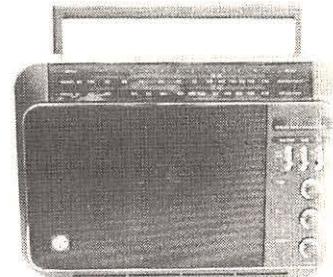
Now we need to clear up one more important bit of radio folklore. The best ground connection in the world will not protect your equipment from a direct lightning strike. For this reason, most folks completely disconnect their receivers from *both the antenna and the ground connection*. I have heard more than one tale in my time about lightning striking nearby and heavy voltage traveling into the shack by way of the ground wire, turning the inside of all that electrical equipment into metallic mush. Ground conductivity works in both directions. Toss the antenna and ground leads outside for extra safety. If this is not possible, place the leads in a heavy glass jar away from everything else in your shack. Equipment can be protected from lesser surges and static discharges by way of protective devices sold through many of the suppliers found in the pages of *MT*.

In those rare cases where it is truly impossible to get a connection to true earth ground by way of wire or water pipe, you need not be left solely to the mercy of your household's wall sockets. A length of wire as long as one half wavelength of the lowest frequency band you want to hear can be connected to your receiver's ground lug and run along your baseboards. This is known as a counterpoise. While not as effective as the above mentioned strategies, it can still improve your listening.

A properly designed ground system coupled with good ground conductivity can improve signal strength and reduce manmade noise—just the kind of project that can be fun to do on a warm spring afternoon.

M

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# Aurora Doesn't Exist...

That's what the Pentagon would like you to believe. Military monitors know differently. Here is a recap of the evidence.

In 1984, the aviation press noticed a project code-named "Aurora," budgeted at \$2 billion, listed on the Pentagon's Defense budget. In another budget document in 1987, the Aurora Project was classified as a two-year *air-breathing reconnaissance project*. But, surprisingly, the next year it was not listed on the public budget. However a new code name has appeared on Pentagon budget reports, "SeniorCitizen," which may be the program's name since the aircraft has become operational.

USAF projects starting with the word "Senior" seem to be those associated with operational "black" projects. Other projects such as Senior Prom and Senior Year have also yet to be identified. No matter; the Air Force still says the aircraft doesn't exist.

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125.400/327.500  
Meteo: 239.800, 373.100  
Air Tactical: 295.400  
Ground Ctl: 228.400/121.600  
Departures: 296.700, 327.500/120.450  
ACC CP: 311.000, 321.000  
Dispatcher: 372.200  
ARR 450/451 primary: 339.200  
ARR 452 primary: 343.100  
ARR 454/455: 261.900  
ARR 459/460: 256.300  
ARR 359/460: 256.300  
ARR 450/451 secondary: 343.500  
ARR 452/459/460 secondary: 319.500  
ARR 454 secondary: 366.300  
ARR 455 secondary: 348.900  
Oakland Ctr: 281.400/132.200, 316.100/127.950  
Sacramento App: 271.300, 285.600, 340.900  
Squadron Freq: 373.100  
Navy: 269.800

### GROUND FREQUENCIES

Security: 148.500 (149.225 in)  
Fire/Crash: 148.200  
Car Pool: 150.3450  
Commanders Nets: 148.035 (150.255 in), 148.050 (149.525 in), 149.050,  
164.500  
Base Ops: 150.225  
Civil Eng: 150.200  
Pagers: 138.325  
POL Trucks: 150.315  
Medical Services: 148.095, 148.100  
Aircraft Maint: 148.2459, 148.450, 149.150  
Commanders Nets: 148.035 (150.255 in), 148.050 (149.525 in)  
Law Enforcement: 149.550 (149.050 in)  
Misc. freqs. not identified: 163.5125, 164.500

### The Evidence

The first hard evidence that someone was testing a hypersonic aircraft surfaced in 1990 when strange rumbling sonic-booms started waking California residents and alerting earthquake detection equipment. The sonic booms couldn't have been from the recently retired SR-71, the Space Shuttle or your throttle happy jet jockey, according to the unique seismic signatures the sonic booms left behind. The sensors indicated the direction of travel to be over California toward Nevada, pointing to the super-secret test base at Groom Lake.

According to Jim Mori, a seismologist at the California Institute of Technology, the signatures recorded by the 220 seismic sensors operated by the U.S. Geological Service indicated sonic booms emanating from aircraft(s) traveling at supersonic speed.

Mori theorized that the frequency and shape of the seismic wave indicated the sonic booms were caused by an aircraft much smaller than the Space Shuttle and approximately the size of an SR-71. However, the only flying SR-71 was not flying at the time of the "skyquakes."

In an attempt to discredit the "skyquake" evidence, the USAF hired experts at Massachusetts Institute of Technology's Lincoln Laboratories to analyze *one* of the seismic recordings recorded from Catalina Island. Lincoln Labs concluded that the aircraft was an F-14 on a test flight off the coast of California and therefore the USAF concluded that all the sonic booms were caused by F-14s.

This explanation doesn't hold water, for sensors located over eighty miles inland also recorded the sonic booms, and the USAF flight Test Center states that sonic booms of an aircraft flying at 50,000 feet only extend about 25 miles. Besides, the unique signatures of the sonic booms suggest a rolling rumble and not the sudden pop-thud of a fighter sonic boom.

### Eyewitness Accounts

Recently, there have been many sightings of several strange shaped aircraft from all over the United States and even abroad. An aircraft with a diamond shaped pattern of lights was seen flying in a formation of F-117s, refueling with a KC-135Q tanker near Beale AFB, California. Other witnesses saw two T-38 jet trainers escorting a third unknown aircraft displaying the same diamond shaped lighting patterns down to a runway at Beale. If someone wanted a base with established intelligence processing facilities, Beale is among the best. The USAF's fleet of TR-1/U-2 tactical reconnaissance aircraft are based at Beale.

However, it is unlikely the Aurora is based at Beale as of yet; the sightings may have been due to the aircraft either being forced to land by mechanical problems or as part of an orientation flight to Beale. Beale is the logical permanent base for any spyplane.

### Aurora/Senior Citizen Abroad

Whatever the code name for the hypersonic aircraft, it has also been sighted visually and on radar screens from the South Pacific to the Scotland. Because of the extreme speeds reached by the aircraft, it is impossible to confine test flights to secret ranges in California and Nevada. At the speed the aircraft is thought to obtain (Mach 8), a trip from California to Asia would take only one hour. Trying to test an aircraft of this speed in the confines of a small test range would be like trying to race horses in your backyard. Just to turn a hypersonic aircraft around would take a flight track that would encompass half of the U.S.

The aircraft has been spotted on radar and has also been scaring sheep in parts of Scotland. Mysterious fast-moving radar blips tracked at Mach 3 by civilian air traffic controllers and strange low rumbling engine sounds have been heard at the Machrihanish base.

According to an article in Jane's *Defense Weekly*, oil drilling engineer Chris Gibson, who is an accomplished aircraft observer (having served 12 years with Royal Observer Corp's international aircraft recognition team), saw a strange wedge shaped aircraft over the North Sea in 1989. The aircraft, escorted by two F-111s, was refueling with a KC-135. This further reinforces the idea that the aircraft was being flown to or out of the base at Machrihanish, Scotland.

Some inside sources say they have seen the aircraft at the small South Seas island atoll of Kwajalein, known primarily as a base for U.S. nuclear testing. Military radio monitors in Australia reported listening in on Australian Royal Air Force aircraft as they tracked and chased aircraft traveling at speeds above Mach 6.

## Denials

The Pentagon continues to deny the existence of the Aurora. In an attempt to protect its black projects the USAF has gone so far as tell the world's leading aerospace experts that they are seeing things that aren't there, similar to the way they handled UFO sightings.

Secretary of the Air Force Donald Rice said in a letter to the editor of the *Washington Post*, "Let me reiterate what I have said publicly for months. The Air Force has no such program either known as 'Aurora' or by any other name. And if such a program existed elsewhere, I'd know about it and I don't. Furthermore, the Air Force has neither created nor released cover stories to protect any program like 'Aurora.' Other accounts, such as of sonic booms over California, the near collision with a commercial airliner and strange shapes loaded into Air Force aircraft are easily explained and we have done so numerous times on the record... While I know this letter will not stop the speculation, I feel that I must set the record straight."

## The Record Ain't So Straight!

With such a firm denial coming from such a high source, it would seem that the Air Force has laid the "Aurora" rumors to rest, right?

Re-read the Secretary's letter and then read the radio communication that came to the Federal File's attention from several military monitors. The transmission took place on one of the "Mystic Star" frequencies, 6.812 MHz. Mystic Star is a worldwide network used by USAF aircraft transporting heads of state, military VIPs and even Air Force One. The transmission was made in the clear (unscrambled).

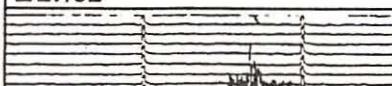
Frequency: 6.812 MHz USB (Mystic Star)  
Time: 2310 Zulu  
Date: 12-10-92

## "Skyquakes" Seismic Evidence

1/30/92



2/27/92



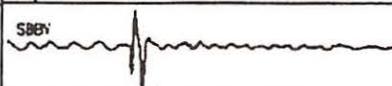
10/31/91



6/27/91



## Space Shuttle Sonic Boom



A general Hogle placed a phone patch from SAM (Special Air Mission) 204 through Andrews, AFB to "AF public relations." Aurora was discussed. The general quoted an article in the *Post* as well as the previous article in "Jane's."

The general said, "It's almost laughable the number of hokey inputs they had. It's kind of similar to the UFO flap. We need to develop a release in response to inquiries. The guts of this should be that we've looked at the technical aspects of the sightings and what the logical answers for them are. You can quote Dr. Mori and cite the Lincoln Lab physics and the FAA's efforts to debunk other incidents."

"Go through three or four of the sightings, take each one on and conclude with a paragraph that says the fantasy of Aurora doesn't exist."

They went on to discuss the sighting in the North Sea from an oil drilling platform. "Someone saw something accompanied by three F-111s. The secretary wants us to talk with McMann and say it was an F-117. I'll get together with Alex — write up a memo to the Chief or the Secretary."

With the help of stealth expert and Jane's *Defense Weekly*'s editor, Bill Sweetman, your Fed File editor was able to confirm the validity of the intercepted communication. SAM 204 was flying that day and did indeed place several phone patches through Andrews. On board the flight was General Hogle (director of USAF public relations) and Secretary Rice himself. The "McMann" mentioned is a high ranking official who works for Air Force Special Projects office.

## What Else Could They Be?

Just for the sake of argument, let's say we believe that the U.S. Government is telling us the truth and that there are no Auroras in the

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Pentagon's military inventory. If this is really the case, then somebody is flying aircraft capable of extraordinary performance over the sovereign skies of the U.S. How come the U.S. Government isn't launching a full scale public investigation into what is behind the sonic disturbances and sightings?

As you can see the subject is intriguing. Military monitors like yourself may be the key to solving this puzzle. The best place to start is to monitor the military communications in your own area for unusual activity. Also if you happen to live in the monitoring range of an Air Force flight test center, then you are in luck. Keep a close ear to the airwaves, and don't forget to report what you hear to the Federal File!

## Mailbag

Speaking of stealth aircraft, James Tunnell, author of *Latest Intelligence*, writes the Federal File and tells us that on a recent vacation to Lake Tahoe he spotted what may have been three of the elusive TR-3A Black Mantas.

James watched as three glowing triangular shaped aircraft flying at high altitude passed over the lake.

It seems that Tahoe is a favorite spot for vacationers and stealth aircraft. When F-117s were stationed at Tonopah, some of their night training sorties would take them over Lake Tahoe—one of the boat docks at Tahoe was designated as a simulated target.

## Another Nail in the Coffin?

The United States Coast Guard, at the beginning of the year issued a Notice to Mariners which states in part:

"Effective August 1, 1993, all United States Coast Guard communications stations and cutters will discontinue watchkeeping on the distress frequency 500 kHz and will cease all Morse code services in the medium frequency radiotelegraphy band. More efficient telecommunications systems are now available to provide the mariner with options for initiating or relaying distress alerts, and passing and receiving maritime safety information.

These options include INMARSAT, Radiotelex (SITOR), mf/hf single sideband and VHF radiotelephone, and satellite EPIRB's (for distress alerts and telecommunications), and INMARSAT SafetyNet, Navtex and HF Navtex (SITOR) (For maritime safety information broadcasts). Navtex broadcasts include the same notices to mariners, weather, search and rescue and fixed fishing gear location products that have been provided by the mf Morse broadcasts.

Distress and other calls to any U.S. Coast Guard Communications station can also be made on any of the following hf single sideband radiotelephone channels: 424 (4134 kHz), 601 (6200 kHz), 816 (8240 kHz), or 1205 (12242 kHz). Meteorological broadcasts are also made on these channels. We believe these options provide sufficient redundancy to ensure that adequate distress and safety communication capabilities are available."

The potential demise of Morse code, and shipboard automation in general, have been discussed before both in this column (March 1989, July 1990) and elsewhere. Now it looks as though the U.S. Coast Guard is driving what appears to be another nail into the coffin of maritime CW operation.

### The "Miracle" of Automation

As operating costs have risen, the shipping companies have tried to find ways of increasing the efficiency of their ships. Increased automation is seen as one way of achieving this. With a greater number of shipboard tasks which can be accomplished with automated equipment, fewer crewmembers are required. Particularly on tankers which spend long periods at sea, two crews are used so that one operates the ship while the

other is on leave. So a smaller crew not only means lowered costs, and presumed greater efficiency, but can save \$50,000 or more per year for each crew position (two crew members) eliminated. Shipping operators would also prefer to reduce the number of positions requiring special training, and the radio officer fits into this category.

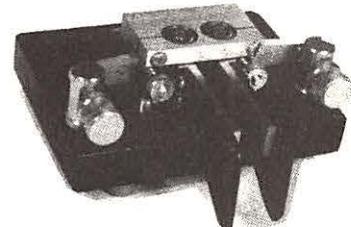
The question arises: can crew size be reduced without affecting safety? If this can be done, which positions can safely be eliminated? Currently, automation is being used extensively in the engine room for collecting information about fuel consumption and monitoring the operating condition of the engines. The advent of MARISAT and its successor, INMARSAT, have led some companies to install systems on their ships which collect information about the operation of the ship and send it automatically to the office via satellite. This type of data transfer allows the company to see how efficiently the vessel is operating and arrange maintenance accordingly.

It also allows the company to determine how the ship operates under prevailing conditions. For those aboard it is sometimes seen as "big brother" looking over their shoulders.

Satellite navigation systems permit greater accuracy in vessel navigation. Now that GPS is almost fully operational, worldwide coverage is making navigational automation seem more likely. The frequency of fixes will be a limiting factor, especially near the coast. The development of computer interfaces for Loran, Satnav, compass and other shipboard equipment is making computer control attractive; however, these integrated systems are still not foolproof. Indeed there are, currently on the market, automatic steering systems which will use information from Loran, Satnav, compass and other equipment to steer a course to a predetermined location, taking intermediate waypoints into account.

One attractive option is for the computer to determine the course which will best utilize the currents and thereby lower fuel consumption. Considering the amount of fuel consumed during an hour on a ship, the saving can be considerable. One problem of automation will be to develop an effective system for handling problems of seamanship—meeting other vessels, handling the vessel in a storm, etc.

*Is this the  
demise of ship-  
board CW?  
Don't count it  
dead yet; some  
said manual  
Morse keys like  
this one were  
outmoded, too!*



### Viewing the Flip Side

As we all know, electronic equipment is not infallible, and there must be a way to handle the failures. Satellites can fail, antennae may be damaged and electronics can fail—especially if the power source dies. Duplication of equipment will alleviate this problem to a certain extent; however, problems can still develop. How do you re-aim the INMARSAT dish when the ship's power dies?

If vessels are to be automated fully, they will have to have failsafe operating and navigating systems. This will include collision avoidance systems, systems to handle mechanical problems, and systems to handle hull punctures and cargo problems which may develop. These things are a long way off, and it is not always possible to get a crew quickly to an unmanned ship to move a shifted cargo or make mechanical repairs.

As far as the radio officer on the ship of the 1990's is concerned—he isn't gone yet. It is true that for larger ships satellite systems are becoming popular. But even though increasing amounts of information are being handled by satellite, personal communications still take place via ordinary radio.

There has been debate in the International Maritime Organization (IMO) about requirements for radio officers under the Global Maritime Distress and Safety System (GMDSS). The third world countries advocate the compulsory presence of an electronics officer on ships of 300 tons and over. This officer would be able to make any repairs to any electronic equipment on board.

The non-third world countries argue that electronics officers would be too expensive to hire. The electronics industry is more willing to pay high salaries than the shipping industry. It is also argued that duplication of equipment will

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- ★ Checks if band is open to Quick Reference Cities

The screenshot shows the Ham Companion software interface. At the top, there's a menu bar with 'Locations', 'Maps', 'Graph', 'Info', 'Quick Reference', 'Utilities', and 'Exit'. Below the menu, there are several pop-up windows and a main map area. One window shows 'County Seat & St. Capital' for Denver, Colorado, with coordinates 39°45'N - 105°00'W. Another window shows 'Capital of U.K.' for London, with coordinates 51°30'N - 000°05'W. A third window shows 'United States of America' with coordinates 29.60, 27.05, and 22.95. The main map shows the world with various overlays: 'Country Names', 'Country & State Borders', 'Grayline', 'Great Circle', and 'Lat/Long Lines'. A propagation graph is visible in the top right corner, showing 'Current Time' with values 24, 32, 30, 28, 26, 24, 22, 20, 18, 16, 14, 12, 10, 8, 6, 4, 2, 00. To the right of the map, there's a sidebar with 'London' and 'United Kingdom - England' selected. Below the map, there's a 'Shipping/Handling' section with rates for USA and Foreign, and a 'TX & OK Res. Add 8% Tax' section. At the bottom, there's a phone number '1-800-874-0771', a price '\$79.95 Plus Shipping & Handling', and payment method icons for VISA, MasterCard, American Express, and Discover.

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allow a ship to get to a port safely where equipment repairs can be made.

For larger ships with automated systems which send information via satellite to the shipping company office, there may be some advantage in eliminating the radio officer and letting the navigation officers handle the communications, using equipment which requires nothing more than a flip of the switch to operate. On smaller ships which may not have automated equipment, or which do not send data to the office, the question becomes more one of communication and keeping the equipment going.

Shipping companies will have to decide whether they need a radio officer who can maintain the shipboard communications equipment, or whether the navigating officers can handle the communications, using backup equipment in case of a failure. Currently, the IMO has not decided what will be required for ships of less than 300 tons.

For ships over 300 tons, it appears that GMDSS will permit INMARSAT-equipped ships to carry their satellite communications equipment in lieu of the more traditional MF/HF CW equipment.

There is a cost factor which must also be considered in sending information from ship-to-shore and vice versa. For reliable transfer of

computer data, INMARSAT is the best method; however, for voice and telex calls consider the following straight charges for a ship operating in international waters:

For a five-minute voice call:

INMARSAT	\$60.00
HF Radio	\$25.00

For an 80 word telex message:

INMARSAT	\$24.00
HF Radio	\$4.90

If we estimate that during a week of operation a vessel might make telephone calls amounting to 20 minutes, then the satellite charges would be \$240 versus \$100 for HF radio. If during the same week telex messages amounting to 1200 words are sent, then the satellite charges will be \$360 and the HF charges would be \$73.50. This means weekly charges for our hypothetical ship of \$600 if it uses satellite equipment, or \$173.50 for conventional HF radio. Over a year, assuming that the vessel will be operating for 50 of the 52 weeks, these charges amount to \$30,000 for satellite communications versus \$8675 for HF radio.

Regardless of who operates it, a ship operating on the high seas will need an HF radio to obtain weather and navigational information. The ship will also need MF and VHF radios for the same reason, as well as to arrange for pilotage and for ship traffic control. Since this equipment will be carried anyway, the shipowner must decide if he wishes to spend another \$30,000 for satellite equipment as well as the additional communications charges.

The figures used above are simply very rough guesses at potential communications use. Also, the GMDSS requirements have not yet been implemented, and these will have a lot to do with what shipowners decide.

Is CW dead? Not yet; the reliability of satellite systems, SITOR and Navtex has not yet been completely proven under all conditions. Handling of distress traffic by satellite has been tested under ideal circumstances, but will the system really work when the ship is burning, or the power has died? It is always possible to jury rig a CW transmitter—but have you ever tried to manually aim the satellite dish?

Starting August 1, 1993, we will begin to find out just how effective some of the new systems are. That, in the end, is what will decide the fate of Morse code.

M

## News, Loggings and Trivia

Talk about finding beacons in strange places! Jim McGloin from Orland Park, IL, recently spotted a station directly behind a Taco Bell restaurant, next to a shopping mall. It all started when he heard strong CW signals coming from his AM car radio. Stepping out of his car for a quick look, he spotted a tophat antenna next to a small beacon shelter.

It turned out to be station "HK" operating with 25 watts on 332 kHz. This beacon is run by the FAA and serves aircraft in the Chicago area.

He enclosed a nice photo of his catch clearly showing the tophat antenna and beacon shelter. There is a smaller antenna on top of the shelter for a separate 75 MHz beacon used during instrument landings.

What Jim apparently heard on his car radio was the third harmonic of the beacon transmitter (three times the actual frequency). The second and third order harmonics can usually be heard within 500 feet or so of a beacon site.

Because of the general coverage (100 kHz-30 MHz) receivers built into modern ham gear, hams are becoming more frequent visitors to the beacon band. Ron Chapman, KB8JTD, of Springfield, OH, uses his Kenwood TS 440-S ham rig to hunt and log beacons.

One catch in particular had Ron (and me) stumped for quite a while. The mystery station was HW (297 kHz). There's no listing for this beacon in the beacon directory, yet he was hearing it very clearly at his location. After some searching through my records, I now believe this

station to be located in Wilmington, OH, possibly a frequency of 299 kHz. Any other loggings or information on this beacon would be helpful.

### Out of Band

Sometimes we've been known to take brief excursions beyond 500 kHz when it seems appropriate. One such topic would be the beacon-like CW signals in the 1600-1800 kHz MF band. The most common signal heard there consists of a four character Morse ID, but there are other signals that merely send out beeps.

There's been much speculation as to where these signals originate and what their purpose is. The latest information seems to indicate that at least some of them may be from low power buoys used to mark the locations of fishing driftnets. David Sage of Boston, MA, sent along a few such loggings, along with an ad for one of the floating transmitters.

While driftnet buoys may explain some of the signals, there are still parts of the puzzle missing. Al Underwood of Silver Springs, NY, specializes in these signals. He has raised some interesting questions about them: How is it that, using just a few watts and a short antenna, they are consistently heard at great distances? Wouldn't the fishermen all have to know CW to make sure they were following the right signal? And what about licensing; who assigns the ID's and who verifies that there are no duplicates? Is there significance to the letters and numbers used?

All good questions. But despite Al's tireless attempts to get some answers, he's gotten the familiar run around. In fact, the FCC claims no knowledge of their existence! You may want to stay tuned to this band. With the upward expansion of AM broadcasting and recent UN resolutions that ban driftnet fishing, big changes could be in the works.

### Loggings

This month's contributors are: Stan Forsman (CA), Bill Burns (IN), Ron Chapman (OH), Jim McGloin (IL), Robert Randall, Jr. (SC), Bob Combs (NM), Bill Hennessey (TX), Perry Crabill (VA), and Jerry Brookman (AK). The contributors are all identified by their initials in Table 1.

And finally, Ernie Lawrence from Perry, NY, sent in three prized loggings from earlier this winter. They were: DDP (391 kHz) San Juan, PR; CBC (413 kHz) Cayman Islands; and ZLS (525 kHz) Stella Maris, Bahamas. Note the high frequency of ZLS. It has moved to this frequency from 320 kHz.

Ernie got started in LF as part of a science experiment where he teaches school. After a

Table 1: Beacon Loggings

Freq	ID	Location	By
196	FRN	Ft. Richardson, AK	J.B.
198	DIW	Dixon, NC	B.H.
206	GLS*	Galveston, TX	B.H.
209	IB	Atikokan, ONT	P.C.
216	CLB	Wilmington, NC	J.M.
227	ASE	Aspen, CO	B.C.
236	GNI*	Grand Isle, LA	B.H.
239	GIW	Greenwood, SC	R.R.
247	ILT	Isleta, NM	B.C.
257	PLD	Portland, IN	R.C.
270	OAX	Oaxaca, Mexico	B.C.
284	QD	The Pas, MAN	B.B.
284	YOC	Old Crow, Yukon Terr	J.B.
305	RO	Roswell, NM	B.H.
329	CH	Charleston, SC	R.R.
332	QT	Thunder Bay, ONT	B.B.
338	CMQ*	Anchorage, AK	J.B.
341	YYU*	Kapuskasing, ONT	J.M.
350	ME*	Chicago, IL	J.M.
362	LYL	Lima, OH	R.C.
366	YMW	Maniwaki, QUE	B.B.
371	ITU	Great Falls, MT	S.F.
382	LRJ	Le Mars, IA	P.C.
383	HM	Queensland, Aust.	J.B.
388	AM	Tampa, FL	R.R.
391	EBY	Neah Bay, WA	S.F.
394	EZZ	Cameron, MO	B.C.
400	HU	Sacramento, CA	S.F.
405	YXL*	Sioux Lookout, ONT	B.B.
417	HHG	Huntington, IN	J.M.
526	RWE	Camp Robert, CA	S.F.

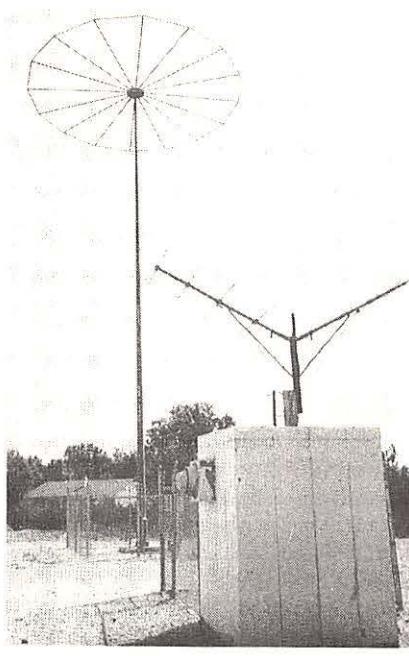
\*Includes WX broadcast

very modest start, he's become hooked on chasing beacons, and he's logged over 130 of them. He was one of the many contenders for last year's Longwave DX Award (LDXA) and asks if there will be any contest for this year.

You bet, Ernie. I've put together five trivia questions that can be answered with just a bit of effort. To enter, send your answers by March 31st to: Below 500 kHz, Trivia Fun, c/o Monitoring Times, P.O. Box 98, Brasstown, NC 28902. Two winners will be drawn from the pool of correct entries. The winners will receive a copy of the *Utility Guide for the 0-900 kHz Spectrum* compiled by European DXer Ary Boender. Here goes...

1. What is the authorized frequency for U.S. LOWFERS?
2. List the two U.S. agencies responsible for most LF beacons.
3. What does GWEN stand for?
4. List two compact LF receiving antennas.
5. List the identifiers for any three Canadian beacons.

Anyone submitting a correct entry will receive a certificate to recognize their participation. Good luck!



Jim McGloin

"HK" (332 kHz) near Chicago, IL

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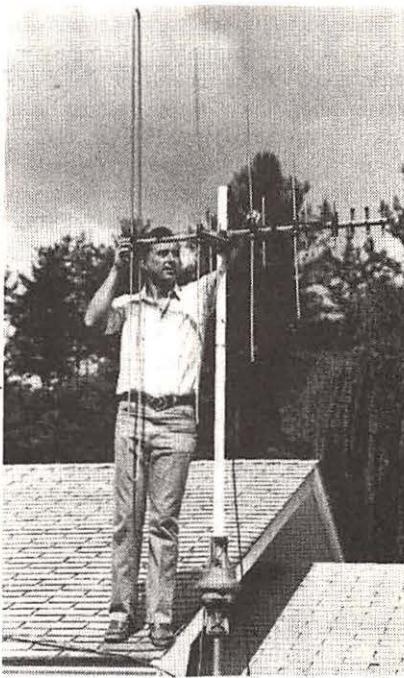
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## A Man And His Country

Old voices come alive every weekday morning in Winchester, Tennessee. Bill N. Morris sits down at the controls at WCDT, and brings musicians from the past eighty years back to life. At about five minutes after eleven in the morning, Chet Atkins' "Guitar Blues" starts to play as Bill greets his listeners. His warm voice makes you feel like you're sitting in a comfortable chair by an open fire. Every show is filled with surprises. Bill has collected over 10,000 country and western 78s and LPs, dating back to the beginning of the century, and he'd love to play some for you. A good time is guaranteed!

"I started collecting seriously in 1948. My Dad bought a Victrola from a neighbor, an old wind-up affair, and it was filled with Jimmy Rodgers, Carter Family and Riley Puckett records." Five years later, high school was coming to an end for Bill, and he had already discovered a way to improve his record collection. "A radio station usually provides a good source of records, duplicates, and things like that. I really got started in radio so I could be around more records, more than I could afford to buy."

Forty years later, Bill still enjoys his work and his hobby. As Assistant Manager of WCDT, he does everything that needs to be done around the station. Only about five people work at the thousand watt on 1340 kHz. The backbone of their programming is local news, sports and talk. "That's the only way a small station now can survive. You've got to give them what the big boys can't, and that's what's happening down the street." Every morning before Bill goes on the air, the WCDT Breakfast Club broadcasts live from Shoney's Restaurant in Winchester. During most of the afternoon and evening you'll hear music provided by Jones Satellite Service's "Great American Country" format.

Situated on the southern shore of the Tims Ford Reservoir on a plateau adjacent to the Cumberland Mountains, Winchester is filled with activity. You'll find the town between Huntsville, Alabama, and Chattanooga, Tennessee. A diversified collection of farms producing dairy products, tobacco, cotton, wheat, soybeans, and nursery plants, fills the surrounding countryside. Many people work at The Arnold Engineering Development Center, a military installation that serves the public and private sector. Huge wind tunnels on site provide testing grounds for a variety rocket and jet engines. WCDT rarely suffers from a shortage of local news!

Bill's record collection is enjoyed by everyone who listens, regardless of their profession.

His show is a living museum of country music because many of the records he plays are no longer in print. Since 78 rpm records have not been widely produced since 1959, most of Bill's collection is quite old. Specialty labels, like Rounder and County, have transferred many old recordings to LPs and CDs, painstakingly restoring their sound. Bill often plays these recordings, but "with special needles that are available, you can get really good sound out of good quality 78s."

Collectors often find old 78s at garage sales, flea markets, or even by going door to door and asking for them. Private collectors, like Bill, also trade lists of records they would like to sell and buy. An excellent source of these reissued records and collectibles is John Morris. His company, Old Homestead Records, (P.O. Box 100,

and fiddle, and a four string banjo, even more so than a five string. They used a lot of mandolins and guitars. The Carter Family used the autoharp. The Allen Brothers cut a lot of records and used the kazoo as their main instrument!"

The growth of the country music recording industry is exemplified by the rise of performer Bob Wills' career. "He got a little money, and somebody else would join that could play another instrument, and the first thing you know you have Bob Wills and His Texas Playboys complete with drums, horns, and piano, and all kinds of stringed instruments."

Recorded in 1936, Bob Wills' "Basin Street Blues" is Bill Morris' all-time favorite. "I think it shows a perfect blending of the big band sound with the country and western swing flavor. He used the fiddle and steel guitar, as well as the saxophone and the trumpet in that particular song. The first time I heard it, well, I just fell in love with the song and it has my vote as best recording of all time."

Radio and country music have enjoyed each other's company for a long time. "In the early 20s, when radio began to cut into record sales, they branched out and found that people who were listening to artists, such as Fiddlin' John Carson, on the radio were more than willing to buy their records. Radio made the record industry search out new kinds of artists to record to give them a broader base. People were getting tired of military bands and classical soloists and The Original Dixieland Jazz Band and things like that. They were recording basically standard stuff." As the 20s came to an end, stations like Atlanta's WSB, WBAP Fort Worth, WSM Nashville, and WWVA from Wheeling, West Virginia, had turned to country music as their mainstay.

Very few memorable tunes have been overlooked by Bill. "I just try to hang on to things that I feel have mass appeal to my audience and to me. I have a friend who goes in for the more obscure country records. Sometimes he'll come by and say 'I've got the only record that so and so made.' He'll play it and you can figure out why he never made another one! Nobody wants to buy the one he made! I've collected mostly the things that were more popular." Bill also enjoys learning about the lives of the people he plays on the air. Visits to libraries and museums provide him with interesting tidbits that Bill often shares with his listeners.

Collecting records is truly an art form in Bill's eyes. It takes a lot of experience to grade a 78 rpm record properly. Serious collectors rate their finds from mint condition to poor: "stepped



*Bill Morris keeps tradition alive on WCDT.*

Brighton, MI 48116) distributes Rounder and County releases, and also records current performers who sing in traditional country styles.

Sampling the sounds in Bill's record room is quite an experience. His earliest records feature "nothing more than a fiddle solo." Later pressings show increasing sophistication: "Guys began singing with a guitar, and then fiddle bands, which consisted of mainly a fiddle and a guitar were recorded. Later on, in the 20s, you would add a banjo, and somebody would add a second fiddle or a bass. The Hawaiian style guitar became countrified into what we know as the steel guitar. The Hawaiian dobro became electrified. It just kind of evolved."

"I have heard some good sounding string bands from the 1920s. They used a jew's harp

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on by an elephant, and it sells for peanuts!" Proper storage is essential, too.

"You have to be real careful when you position cabinets for 78s. The floor on which my collection rests is on concrete, so it's quite steady. One fellow I knew lived in an upstairs apartment and his rack was so heavy it just crashed through the floor."

Although some of Bill's childhood was spent in Kentucky, he's almost always been in Tennessee. He finds the music he loves there, and shares it with the fortunate folks in Winchester who listen to WCDT.

### Bits 'N' Pieces

Better late than never? The FCC has finally selected the Motorola C-Quam system as America's standard for AM stereo transmission. The decision comes about ten years late, in the eyes of most broadcasters and equipment manufacturers. The Commission had hoped that the marketplace would bring forth an obvious leader in this field. Several early systems, like the one promoted by Harris Corporation, fell out of the race, but inventor Leonard Kahn fought Motorola for the title to the end. Although his system is technically superior, Motorola employed their powerful promotion and legal resources to best advantage. You may still send your comments about AM stereo to the FCC until April. Public opinion will be considered before the new standard becomes law.

New York City is slowly adjusting to new sounds on 1130 kHz. After 57 years of big band sounds and crooners singing popular classics, WNEW has ceased to exist. "The Make-Believe Ballroom," America's longest running daily radio show, has come to an end, replaced with continuous business news on the new WBBR.

If you miss Tony Bennett and Frank Sinatra, just tune to 1560 kHz. WQXR-AM is now called WQEY, combining their old call letters with WNEW's format and traditions. Beethoven, Brahms and Bach are still heard on WQXR FM 96.3 MHz and via satellite on Galaxy 1, Transponder 15 (6.30/6.48) nationwide.

To insure their programming is fair and balanced, the Corporation for Public Broadcasting has set up a toll-free phone number for comments and suggestions about public radio and television throughout the United States. You can call 1-800-356-2626, 24 hours a day, seven days a week, to let your voice be heard.

### Mailbag

"It is with much sadness that I must report the death of radio personality, musician and

Monitoring Times subscriber Mark Burns of Fairhaven, Massachusetts. Mark died in an early morning car crash on December 4th while returning home from a club DJ gig in the Providence area. Mark was meticulous and organized in his hobby. His setup included a Panasonic RF-B65, a Sony 2010, a GE Superadio, a remote controlled tape recorder for logging late night DX, a faithfully maintained log book, and a collection of QSL cards.

"Mark was one of the most competent, approachable, and least ego-driven people you could ever work with in commercial radio. As his assistant during several of his years as music director of WCAV in Brockton, he and I were programming soul mates who weren't afraid to expose quality new sounds and artists, opening up the rather restrictive nature of the country format. His loss is a devastating one to the music and broadcast communities of New England and Nashville, and he will be sorely missed," writes Jeff Gill. We extend our sympathy to Mark's family and friends.

### International Bandscan

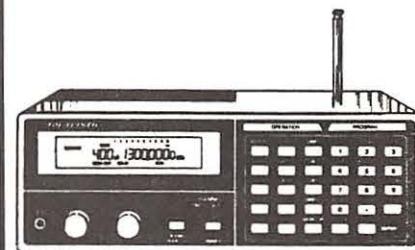
Is it American? Is it Canadian? How about "None of the above"? CKON's studios rest right on the border of the two countries. The board room, transmitter and wash rooms are in the U.S., while most of the administrative offices and recording studios are in Canada. It has a Canadian address and an American address, and has telephone numbers using Quebec and New York area codes. CKON doesn't have a license, either. "We're not an unlicensed pirate station," claims station manager Tim Thompson. "We operate according to the guidelines set out by the Mohawk Nation Council of Chiefs." The people of the Akwesasne Indian Reserve believe their self-government supersedes any claim by the Americans or Canadians.

Canada's CRTC has asked the station to apply for a license, but has not pursued the matter. "Our operating guidelines are based on good taste and common sense. That's really the secret of our success because our guidelines are less stringent than those of the CRTC," program director Ron LaFrance notes. "Because of our flexible programming, we have a large amount of listeners outside of our community. We do it deliberately because we want to stay close with the community." If Canadian licensed stations play music, many of the recordings must be specifically performed and produced by Canadians. Look for this unusual 50 watt station, located in Akwesasne, (near Cornwall, Ontario) on 97.3 FM. And until next month, good listening and happy trails!

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Back in the November 1992 column, I mentioned the California Amplifier LNB (a C-band Feedhorn with Low Noise Block Downconverter built-on). Recently I had the chance to put one of these little jewels on my 4.5 foot experimental dish with most satisfactory results.

Because the LNB has no rotating probe or servo motor to drive the probe, it has no moving parts. Polarity is changed electronically with one wire which is connected to the polarizer "pulse" output on your satellite-receiver.

Installation could not be simpler. To install the LNB, read the well-written instruction sheets at least twice and make sure you are familiar with each step. The LNB is actually shipped in two parts. First is the scalar ring which attaches to the feed supports—either buttonhook or multi-leg support—with bolts and nuts provided. The feedhorn throat and LNB is one piece which attaches to the scalar ring by way of a simple Allen screw on the back of the scalar ring (an Allen wrench is also provided).

### Setting Up the LNB

Once the scalar ring is attached and the feedhorn is slipped into the ring it must be adjusted to the correct f/D ratio. The f/D ratio is the ratio of the focal length (f) characteristic of the parabolic reflector to the diameter (D) of the reflector. This determines how "deep" your dish is.

Don't worry about why this is important—just know that your dish manufacturer has the f/D ratio listed in the installation instructions to your dish. If you no longer have them, California Amplifier has thoughtfully provided you with the formulae to do the figuring yourself. For the incurably curious, those two formulae are:  $F = D$  (Diameter) squared, divided by  $16 \times d$  (depth of the dish) and  $f/D = f$  (focal distance) divided by  $D$  (the dish diameter).

### Yuck, More Math!

To determine the depth of your dish, stretch a string across the center and measure from the bottom of the dish to the string. Using my experimental dish as an example, we find that the diameter (53 inches) squared is 2809; that the depth (8.5 inches) times 16 is 136; and that 2809

# Small Dish and LNB Update

divided by 136 is 20.65 inches which is the distance that the feedhorn should be from the bottom of the reflector. To find the f/D ratio, do this:  $f/D = f$  (focal distance) divided by the diameter (D) of the dish. In our case, 20.65 divided by 53 is .3897 or, rounded neatly, .39.

Etched into the side of the California Amplifier LNB feedhorn are lines under which f/D ratio numbers from .28 to .42 are listed. If you know the correct f/D number, then you simply insert the feedhorn throat into the scalar ring to that point and tighten the set screw. Now, attach the coax cable which goes to your receiver and one small gauge insulated wire from the polarity pulse output of the receiver to the white wire dangling from the LNB.

In less time than it takes to read the above instructions you'll have completed the LNB installation. Adjusting the LNB for proper alignment and proper polarity switching is covered thoroughly in the instructions and won't be repeated here. Suffice it to say that those of us who are not professional installers can still do the job.

### Good Things To Know About the LNB

The first thing you should know is that the California Amplifier LNB is for C-band only. There is no provision for Ku or adding a Ku LNB to the unit. The second thing you should know is that there is no "skew" adjustment possible with the LNB. Nor should there be.

Since the only satellite not in the same orbit inclination as the others has been retired, there is technically no reason to have a skew at all. However, many installers found that the skew did a fair job of covering a less than precise dish installation and alignment. Go over your dish alignment procedure to be certain that it is properly set. This will actually help you to get better pictures: peaking your TVRO system is something that should be done at least once a year anyway.

And, finally, another point to remember is that results with the LNB when used on very small reflectors such as my 53" experimental dish may not be satisfactory when trying to view higher powered satellites in the 2 degree spacing environment. This is because the beamwidth of the smaller dishes may allow sidelobes from the signals of the adjacent satellites to get into the dish and cause interference.

At the time that I used the LNB for this column there were no high-powered satellites 2 degrees apart, though there were several lower

powered satellites to either side of the test satellite. I did not experience any interference.

### The LNB in Summary

On my small dish I received sparkle-free pictures from the newer 16 watt satellites as well as the 11 watt satellites. The installation is very simple with well written and specific instructions. You'll find that the LNB is also reasonably priced.

My recommendation for a standard TVRO installation is to always use the biggest dish you can afford and can install. A lower noise temperature LNB is no substitute for a bigger dish. The performance of the LNB on a well designed and installed 6.8 or 10 foot system will yield very good results.

### Mailbag

We recently received a very thoughtful letter from Richard Shilling of Pacific Palisades, CA. He became interested in TVRO from this column and has been reading everything he can. He writes, "I'm starting to sort it out, but was surprised that there is virtually no information on the subject ... (of decoders). Secondly, many of the receiver manufacturers are companies I've never heard of. Drake I know from shortwave, Toshiba and Panasonic from consumer electronics; but, who are companies like HTS, Chaparral and EchoStar? So far I've yet to uncover any product comparisons as I did for shortwave receivers...I've checked on my roof and I have a clear shot at G-5 and don't intend to track any other satellites...Are receivers of a couple of years ago suitable for use with a small antenna, or to receive G-5 would you need a 'super' receiver?"

These are all great questions and I'm certain that many of you will be interested in the answers. One of the problems for those of us who write the *MT* columns is that we often get so enthusiastic about the progress of our particular specialty that we sometimes don't pay enough attention to the details of getting started. That's where readers like Richard come in. And so, with my feet appropriately to the fire, the answers:

### All About Decoders

The reason that there's little written about decoders is that there is only one decoder available to consumers, the control of which belongs to its originator: General Instrument (GI).

All satellite manufacturers today have the VideoCypher II RS built in to their receivers.

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You don't know it's there. You don't have to. Before encryption, satellite receivers were receivers only. If you wanted a dish drive you had to add a dish controller box to your receiver. If you wanted stereo audio you had to add a stereo processor box to the receiver. If you wanted to watch encrypted channels you had to add a separate decoder.

Then in 1986, receiver manufacturers saw the advantages of combining all of these features—which by now were not thought of as options—into one receiver. This became known as an Integrated Receiver Decoder (IRD), and for the last six or seven years this has been the state of the art.

When encryption began there was a wailing and gnashing of teeth on the part of TVRO enthusiasts who believed that what had been free was unrightfully taken from them. Concerted efforts by software hackers made it possible for the unscrupulous to continue to watch for "free."

Actually, these "chipped" boxes were anything but free. Hackers were charging \$1,000 and more for chipped boxes. With no guarantees on how long the chipped boxes would work, many a dupe paid over and over for programming they could have had legitimately for half the price. I've refrained from discussing the scrambling issue, believing that the old dead horse had been flogged enough.

Last fall GI introduced the aforementioned VCIIRS. The RS stands for Renewable Security and refers to new software and hardware which has been designed to so hamstring the chip pirates that they'll be driven out of the marketplace. So far, judging from the record number of new GI authorizations, the system seems to be working well. Incidentally, legitimate subscribers didn't pay a dime for the up-grade process.

### Comparison Guides

The reason there is no highly regarded comparison guide to satellite equipment is unclear. There are various "buying guides" which do compare various pieces of equipment but certainly not critically. Why some of the more well-heeled and less ad-dependent publishers don't venture into this type of consumer service remains a mystery.

Still, for the technically minded there is a great deal of in-depth information on various new products in the pages of *Satellite Retailer*. This monthly publication, as its name implies, is aimed at the TVRO professional. Its subscription price at \$12/year is the best bargain in all of satellite TV. Unfortunately, it's available only to "qualified individuals." Find out if you are a qualified individual by calling *Satellite Retailer* at (704) 482-9673.

### Who Are These People?

By having access to publications such as *Satellite Retailer* it doesn't take a reasonable person long to understand who the big players in TVRO are. The R.L. Drake Co. was driven out of the amateur radio market by Japanese competition, but has so far remained competitive in the TVRO market. They not only make their own products but also those of some other household labels.

The best way I have found to judge the worth of some of these labels is to grill the local satellite TV repairman. But don't stop there—never take any one person's word on anything, including mine! After you've talked to half a dozen folks who repair TVRO gear, certain patterns emerge. Pay attention to them.

### Used IRDs

Buying a used IRD and setting it up for G5-only reception is a good idea. That's because virtually all 24 channels on G5 are encrypted and you'll need a decoder to enjoy the programming. A good used IRD without the VCIIRS decoder module shouldn't cost more than \$300. The modules are being sold with six month or annual subscriptions to programming on G5. Prices are around \$350 for the module alone and another \$200 for annual subscriptions. Shopping around for best prices is always a good idea. Call your local dealers, as many as you can find, and ask prices for their used IRDs.

M

California Amplifier, Inc., 460 Calle San Pablo, Camarillo, CA 93012; 805-987-9000; fax 805-987-8359.

## Low Band DXing

Spring is right around the corner! Well, not necessarily; it depends on which hemisphere of the earth you live in. Perhaps it is autumn that is right around the corner! It really doesn't make much difference unless you are interested in working real DX on the lower frequency bands.

The important thing to the low band DXer is the fact that when spring approaches in one hemisphere, fall is approaching in the other. This brings several factors into play which are significant for the low band (160, 80, 40 meter) DX hunter.

### Limiting Factors to Low Frequency DXing

It is possible to work DX on the lower frequencies any time of the year. The limiting factor is usually atmospheric noise (noise created by electrical storms). As we all know, electrical storms occur usually during the warmer months, so DX is not as good in the summer as it is during the colder winter months. Remember, though, that winter in the northern hemisphere corresponds to summer in the southern hemisphere. Consequently, even though it might be possible to hear signals from the other hemisphere, it is usually impossible for them to hear us!

The time of day is a second factor limiting our ability to communicate over long distances on the lower frequencies. During the hours of daylight a layer of dense ionization forms at a height of 40 to 60 miles above the earth called the "D" layer. The D layer absorbs energy at lower frequencies (below about 10 MHz). This layer disappears very rapidly after sunset and forms again as the sun rises. As you might imagine, it is possible to work great distances during the sunrise and sunset periods on the lower bands by utilizing the phenomena called the greyline (grayline). With good conditions and adequate equipment it is often possible to work stations on the other side of the earth if their sunset or sunrise corresponds with the opposite period at your location.

The third limiting factor is our receiver! A receiver with a low threshold of noise is required for DXing on the lower bands. The noise generated in the receiver must be lower than the atmospheric noise to enable us to receive the weak signals coming from distant stations. For the most part modern receivers have a very low noise threshold. A simple test to see if your receiver is up to snuff is to turn the receiver on and disconnect the antenna: if there is not a significant drop in the noise level, it is time to consider renewing the hearing aid!

Of course, if you live in a very noisy location there is little that can be done to improve the situation. One possible improvement is to use a loop antenna or some kind of grounded antenna for receiving. A narrow bandwidth will also improve reception on DX signals. The narrow bandwidth limits the amount of noise we hear; consequently we are able to hear weaker signals. For weak CW a sharp 400 or 500 Hz filter is adequate, but 250 or 200 Hz will oftentimes be appreciated. SSB, on the other hand, requires a steep sided 1.8 or 2 kHz filter. In either case, a slow, steady hand on the tuning dial is needed.

### What You Should Have Learned So Far

- 1: Low frequency DX is best at night on both sides of the path.
- 2: Watch for rare DX during the hours of sunrise and sunset.
- 3: Best time to work the antipodes (opposite hemisphere) will be during the spring and fall months.
- 4: Use a receiver with low noise threshold and good sharp filters.
- 5: If there is a lot of electrical noise at your location, DXing on 160 and 80 will be difficult unless you can cure the noise problem.

### Required Equipment

The average 100 watt station and dipole will be able to work DX if the location is electrically quiet. I know one low band DXer who runs 250 watts to a dipole 25 feet above ground and does quite well, having confirmed nearly 200 countries on 80 meters.

While the simple dipole antenna will let you work a lot of DX, having a vertical antenna is a big plus in your quest for the rare one. Generally speaking, a good vertical will outperform the dipole about 70 percent of the time. My favorite low band vertical is the Butternut HF2V. Using this antenna and 75 watts on CW, I worked 130 countries on 80 meters during a single winter DX season.

Any well constructed vertical will work fine as long as it is properly matched. The major problem with the vertical antenna is the fact that it is a noisy antenna; consequently, if you live in a location with a lot of electrical noise, you should consider using one of the specialized receiving antennas such as the Beverage or rotatable loop antenna, in addition to your vertical



The shack at N3IK.

transmitting antenna. If room is available, the one wavelength loop or triangle antenna provides low noise and a small amount of gain for both transmit and receive. Excellent information on low band antennas can be found in the *ARRL Antenna Manual* (225 Main St., Newington, CT 06111).

Most of the DX on 80 and 40 meters is found inside the "Extra Class" portions of the band. Some DX is available in the "General Class" bands, but not as much. Sometimes DX stations announce that they are listening to the General sub-band, especially during contests and DXpeditions.

One last item most low band DXers find indispensable is the ability to do without sleep! The low frequency bands are definitely night-time bands and pursuit of DX here requires late night hours. It is best to locate the shack where other family members will not be disturbed, and use headphones!

### Your Pleasure?

I get quite a bit of mail from readers with information about events happening in the world of Ham Radio. Most of the time the material is received too late to use in this column. Other readers request information about specific rigs and still others would like to see simple construction projects.

While I do review some rigs, most reviews in this column will be for station accessories and antennas; this is due mainly to space limitations. I do like construction projects and will attempt to present them from time to time.

If you will write me a note in care of P.O. Box 98, Brasstown, NC 28902, and express the kinds of projects and articles you would like to see, I will do everything I can to bring them to you. In fact, if you have some special project or antenna, tell me about it, send a diagram, and we might be able to use it in "On The Ham Bands".

That's all for March, gang; good lowband DXing!

73, Ike, N3IK

Rob Record's

## Ham DX Tips

March is an excellent month for DX. The ARRL SSB contest opens the month on the 6th and 7th, while the CQ WPX (Worldwide Prefix) SSB contest closes the month on the 27th and 28th. Add to this the vernal equinox, which is a shift in the tilt of the earth's axis allowing for greater propagation from the Northern to Southern Hemispheres and vice versa, and you have an great time to DX the ham bands. Starting our DX tips this month is one from the Southern Hemisphere.

**ARGENTINA** An active DXer in contests is LU1SM who is Carlos Menen, the President of Argentina. He particularly likes 10 meter SSB (28300-28600 kHz). **ANGOLA** D2/N6QHO, who works in the oil industry here and says he will be here for the next two years, favors 21300 kHz SSB at 2015 UTC daily. He asks that you send your QSL requests to his home address: Elliot Steinberg, 30 Lynch Ct., Concord, CA 94521. **BURKINO FASO** XT2BW has been a regular on 21085 kHz RTTY at 1900 UTC after which he switches to 14085 kHz at 2000 UTC. He meets his QSL manager WB2YQH (Robert Nodolny, 135 Wetherstone Dr., West Seneca, NY 14224-2540) on 14210 kHz SSB at 2100 UTC daily. After they conduct their business, XT2BW will make contacts with those needing this country. **CANARY ISLANDS** EA8BUC is on or near 21420 kHz SSB at 1600 UTC daily. QSL with a self addressed stamped (US stamps) envelope to his U.S. address: Buddy Robins, 50 w 67th St., New York, NY 10023. **CARIBBEAN** Emergency and Weather net (remember we are entering another season for severe weather in this area) meets on 3805 kHz SSB daily at 6:30 AM and PM. **CZECH REPUBLIC** I am sure that most of you know by now that Czechoslovakia ceased to exist at 2300 UTC on 31 December, and that the Czech and Slovak Republics came into being. The prefixes for the Czech Republic are OK and OL. The suffixes of callsigns will remain the same. The QSL bureau for this new country: P.O. Box 69, 11327 Prague, Czech Republic, Europe. **CHINA** Individual amateur licenses have been issued here using the prefixes of BA, BD, and BG. BY prefixes are still the club stations, and amateurs who operate only from a club station but have an individual license will use the prefix BZ. **CONGO** TN1AT has been on 14256 kHz SSB daily at 1700 UTC with PY2PE's net. QSL to F6FNU, his QSL manager: Antone Baldeck, B. P. 14, F91291 Arpanjon, Cadex, France. **CROATIA** The new Croatian (prefix S51 to S59) QSL Bureau address is: HRS, P. O. Box 564, 4100 Zagreb, Croatia. **INTERNATIONAL** Association of Aero Hams Net meets Wednesdays and Sundays at 1600 UTC on 14280 kHz and Tuesdays and Thursdays at 1500 UTC. This is an interesting net whose members are not only present and past military and professional civilian pilots, but air traffic controllers and others who have a connection and interest in flying. **ISLE OF MAN** GD4WBY (Jerome Jones, Fairfield, Jurby Rd., Lezayre, Isle of Man, U.K.) has been on or near 24955 kHz SSB daily at 1400 UTC daily. **KAMPUCHEA** Here are two chances to catch this rare country on two different bands. XU3UN is on 3795 kHz SSB most days at 1030 UTC. Send your QSL requests to his QSL manager: SP5AAS, Damian Osiejewski, Box 7, 2-845 Warszaw 95, Poland. XU7VK has been on 14225 kHz SSB at 1200 UTC daily. QSL to: Laszlo Szabo, Box 24, H-4151, Pugpokladany, Hungary. **MADAGASCAR** 5R8DG has been on 24950 kHz SSB at 1430 UTC daily. He also uses F6FNU as a QSL manager: Antone Baldeck, B.P. 14, F91291 Arpanjon, Cadex, France. **NAVASSA ISLAND** W5IJU says that there will be a DXpedition operating from here starting 26 March to 3 April using the following frequencies and modes: CW 3505, 7005, 14025, 21025, and 28025; SSB 3795, 7075, 14195, 21295, 28495; RTTY 14085, 21085, and 28085 kHz. **SLOVAK REPUBLIC** The new prefix for this country formed from the former Czechoslovakia is OM. As in the case of the Czech Republic, the amateurs here will retain their suffixes, only the second letter of the prefix will change. So, OK3LU will now be OM3LU, for example. Also a new national amateur radio society has been formed here with OM3LU as its president, while OM3EA will head its QSL bureau. The address of this new QSL bureau is: Slovak Amateur Radio Union, P.O. Box 1, 85299 Bratislava, Slovak Republic, Europe. **SLOVENIA** Their new QSL bureau is: ZRS, Box 180, 61001, Lubljana, Slovenia. **VHF/UHF** Enthusiasts have a net that meets Mondays at 0300 UTC on 3843 kHz SSB. Here you can find out about the latest developments in VHF/UHF DXing especially now that the spring skip season is upon us and warmer weather will bring out more operations from rare grid squares. **VIETNAM** 3W4VL is believed to be a Russian operating from here who has been on 14023 kHz CW daily at 0100 UTC. His QSL manager is: OM3IA Paval Horvath, Radvanska 16, S-81101, Bratislava, Slovak Republic.

Good luck in the contests and 73 de Rob.

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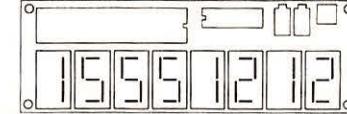
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## 1992 Breaks Pirate Activity Record

The final results are in, and it is now clear that 1992 was the biggest year in the history of North American pirate radio. Approximately 200 USA and Canadian pirates were heard on the shortwave bands last year, 15% over the previous record set in 1991.

Several Outer Limits' columns last year were headlined by high profile FCC pirate busts. The **Radio USA** bust produced a record \$17,500 fine from the Federal Communications Commission. Many speculated that the increased enforcement threat would deter pirate broadcasting, and that the number of pirate stations would shrink.

Nothing could be further from the truth. New stations popped up by the dozens, and scores of veteran pirates maintained a continual presence on the bands. The tidal wave of activity is still cresting, as we can see in the column this month. Our readers logged 33 different stations at the very end of 1992 and early in 1993. The bumper crop of intercepts once again strains the page limits in this magazine. Why not tune around the pirate bands next weekend? Your odds of success have never been better.

### Unusual Activity Reported

Many DXers have recently noticed a mysterious relay of licensed Virginia commercial radio stations in the 49 meter shortwave band. We have reports this month on the strange situation from Mark Seiden of Miami, FL; Rob Ross of London, Ontario; and Pat Murphy of Chesapeake, VA.

Both Rob and Pat heard an apparently live relay of **WMXN-FM**, 105.3 MHz in Portsmouth, Virginia, with rock oldies, ads, weather, and other routine commercial radio fare. This has been a daily event on 6250 kHz in AM mode. The signal is audible at least between 2200-1100 UTC (!), so the relay could be operating on a 24 hour basis. Mark heard the station on a slightly lower frequency of 6237.5 kHz at 0330, but its relay subject was **WBSK** in Portsmouth, Virginia (listed on 1350 kHz AM and 107.7 MHz FM, the latter in Windsor).

The purpose and source of this strange relay was not yet known at press time for *MT*. It could be a pirate, but its lengthy and daily operating habits suggest that there could be a different explanation for this highly unusual broadcaster. For instance, there are many military facilities on the eastern Virginia coast. Ideas, anyone?

### Napoleon Williams Jailed

In the November *MT* we pointed out that **Black Liberation Radio** operator Napoleon

Williams received a Notice of Apparent Liability and a \$17,500 fine from the FCC. Williams' local FM pirate on 107.3 MHz prompted the FCC bust. The Decatur, IL, station says that things took a serious turn for the worse in November.

On the 13th, Williams was sentenced to three years in the Illinois State Penitentiary for a September aggravated assault conviction. He had allegedly kicked a police officer during a demonstration at the Macon County Courthouse. Five days later on November 18th, a Notice of Monetary Forfeiture arrived from the FCC, confirming the \$17,500 pirate fine.

Williams claims that the criminal charges were trumped up. He promotes a theory that he and his family are being persecuted because of his local political activism through pirate radio. Macon County Circuit Court sentencing Judge Jerry Patton clearly did not agree. The Universal Human Rights Organization of African People has set up a defense fund for Williams, c/o Liberation Radio, 756 South Wise, Decatur, IL 62522.

### VOA Opens its Mail

Since our big headline in December about the VOA's policy of discarding most of its mail unopened, we have new evidence. Steve Hunter of Drexel Hill, PA, reports an unsigned full data **Voice of America** QSL in only 276 days. He reported on the VOA's 50th Anniversary show via the Greenville site. So, *MT* confirms that VOA opens "some" of its mail, at least slowly.

### Little Known Europeans

Patrick Crumhorn of Austin, TX, actively follows the PeaceNet computer BBS system, and he sends in two interesting items. Former ANARC Executive Director Robert Horvitz, now living in the Czech republic, filed an analysis of **Studentsko Radio** on PeaceNet via Fidonet. This new volunteer student FM station operates on 88.4 MHz from Skopje, Macedonia. It's a newly legal version of what would have been both a pirate and a clandestine station only two years ago. PeaceNet also says that a new organization of similar stations in Hungary is forming. The Hungarian Free Radio Association represents a number of illegal pirates in that country.

The address for Studentsko Radio is ul. Ilindenska 45, Skopje, Macedonia. Its telephone number is 38 91 255-231. Only one of the Hungarian pirates in HFRA provides contact information: **Tilos Radio**, PO Box 150, H-1922, Budapest, Hungary. Their phone number is 36 1 135-5770.

*MT* reader Stanislav Mekhonoshin of Perm, Russia, sends in more information on the Russian pirate **Romantic Space Radio**. We covered this station's North American pirate relay via **Radio USA** last month. Stanislav says that RSR has also established a western European pirate relay arrangement with **Live Wire Radio**. Pat Murphy sends in a January log of LWR on 7415 kHz at 0030, so this Europirate can sometimes be heard in North America.

### Radio Free Bayonne

Scott Edwards of Los Alamitos, CA, points out that pirate radio coverage sometimes appears in unusual venues. The December 21, 1992, issue of *The Nation* magazine contained a review of **Radio Free Bayonne**. The station's low power transmitter is scheduled on 90.5 MHz FM on UTC Thursdays between 0030 and 0300, but its tiny pirate signal is only audible within a quarter mile of its lower Manhattan transmitter site. It's operated by the School of Bayonne as an expression of art over the airwaves, and it uses an address of PO Box 1069, Canal Station, New York, NY 10013. Amazingly, the article in *The Nation* provides information on how to acquire and assemble pirate transmitting equipment!

### What We Are Hearing

Clandestine loggings will be held for the next issue so that we can catalog another gigantic explosion of recently heard pirates. Maildrop addresses used by stations listed this month include 770 Sycamore Avenue, #J193, Vista, CA 92083; PO Box 452, Wellsville, NY 14895; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 293, Merlin, Ontario NOP IWO; PO Box 17534, Atlanta, GA 30316; PO Box 493, Boys Town, NE 68010; and PO Box 146, Stoneham, MA 02180.

**Action Radio**- 7416 at 1800. A. J. Michaels mixes rock music, parody ads, and commentary from the western coast of Nebraska. Addr: Boys Town. (Don Schneider, Pittsburgh, PA, Michael McDaniel, West Bloomfield, MI)

**Alternative Elvis**- 7415 at 0145. Neither Elvis Presley or Jerry Glanville have anything to do with them. They instead feature rock tunes by Elvis Costello. Addr: Wellsville. (Murphy)

**Anarchy One**- 7417 at 0400. Captain Anarchy continues his political commentary, with calm but strong attacks on the existing order. Addr: Vista, CA. (Shortwave Ape, Livermore, CA)

**Christian Rock Radio**- CRR's religious programming is quite different from the licensed preachers on **WYFR** or **KCBI**. Heavy metal Christian rock selections are supplemented by interviews with the musicians. Addr: Wellsville. (Ross)

# LOOK OUT!

QSL #5

ITS THE RADIO AIRPLANE!

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An airborne QSL from Radio Airplane.

**Christmas Day Radio**- 7418 at 0230. This "ho ho ho" Euro-rock station appears to have been a one-shot holiday effort. Addr: None. (Murphy)

**CSIC**- 7413 at 2200. The Canadian Pirate Rambo alternates between this frequency and 7425 kHz. He programs his own eclectic shows that normally include pirate radio commentary, and he frequently relays other pirates. Look for their "Psycho Chicken" interval signal. Addr: Blue Ridge Summit. (Murphy)

**Happy Hanukkah Radio**- 7413 at 2300. This new one, obviously from the holiday station genre, plays Jewish music. Addr: Merlin. (Murphy)

**He Man Radio**- 7415 at 2330. He Man and He Man Jr. program rock and bagpipe music, sports commentary, sexist remarks, and a running feud with Kristin Kaye of the WWCR "Signals" DX program. Addr: Blue Ridge Summit. (Greg Martin, Fruitport, MI; Ross, Murphy)

**Home Made Radio**- 7415 at 0015. Here's another example from the crop of holiday stations. It transmitted "politically correct" Christmas advocacy. Addr: announced all of the above, but validity uncertain. (Murphy)

**Jolly Roger International**- 7415 at 0530. Captain Blackbeard enters his fourth year of broadcasting with the slickest rock music shows in pirate radio. You'll like this one, with their famous "JR I in the Sky" helicopter reports on FCC vehicles below. Addr: Wellsville, requires \$1 return postage. (Ross, Seiden, and direct from the station)

**Midnite Radio**- Maxwell Silver dug into his pile of old reception reports, and recently arriving QSL's usually are taped to a picture of his transmitter. Addr: Blue Ridge Summit. (Bill Hennessy, Marble Falls, TX; Seiden)

**Pan Global Wireless**- 7416 at 0045. Mike Oxlong's new pro-marijuana station programs rock, parody ads, and attacks on government bureaucracies. His announced location in Sonora, Mexico, is reinforced by the Mexican national anthem at sign-off. Addr: Wellsville. (Murphy)

**Pirate Radio Boston**- 7415 at 0000. Recent programs from this New England station have included rock music, a song title contest, and a listener mailbag. Addr: Stoneham. (Martin, Ross)

**Radio Airplane**- 7416 at 0600. This new station features rock music and comedy, supposedly transmitted from a Piper Cub plane in flight. Their QSLs list information on an actual FAA flight log form. Dave's first pirate! Addr: Wellsville. (Dave Ditlow, Los Angeles, CA)

**Radio Blandx**- They have the best DX program parody in the history of shortwave broadcasters, licensed or pirate. Addr: Blue Ridge Summit. (Murphy)

**Radio Clandestine**- 7415 at 2300. Announcer R. F. Burns has transmitted slick rock music, comedy routines, and novelty music for two decades. Recent shows have been rebroadcasts of old programs. Addr: Former addresses defunct. (Murphy)

**Radio EXP**- 7415 at 2300. Normally their fare is rock music, but they ran a holiday seasonal show. Addr: Wellsville. (Murphy)

**Radio Free America**- 7405 at 1500. Host Bill O. Rights plugs the USA constitution, particularly the amendments bearing his name. Addr: Wellsville. (Murphy)

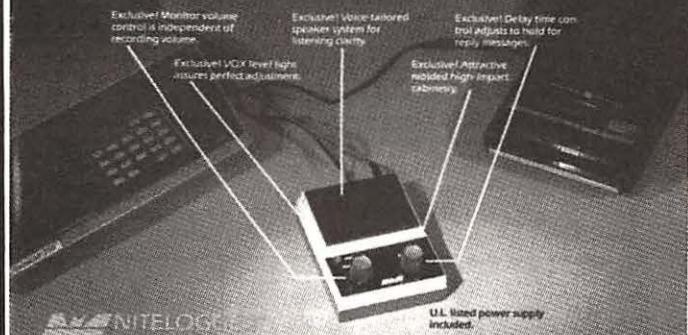
**Radio Free Dream World**- 27995 at 2130. We have the first printed log for this previously unknown operation, which features moralistic dramas and rock oldies. Note the frequency, which most of us don't check out as often as we should. Addr: None. (Christopher Zeman, Lake Villa, IL)

**Radio Fluffernut**- 7420 at 2230. While their name is unusual, their programming is fairly standard heavy metal music. Addr: Merlin. (H. R. Dutcher, Brooklyn, NY; Murphy)

**Radio Scottish Montreal**- 7425 at 0330. The ethnic format on this station includes Scottish music and discussions of local Scottish activities in Quebec. Addr: Blue Ridge Summit. (Martin)

**RBCN**- 7415 at 0215. Radio Bob's Communications Network is both a relay for the **Voice of Shakerag** and a source for original shows. Addr: Atlanta. (Schneider, Seiden)

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**7415 Radio**- 7415 (what else?) at 2300. They produce an interesting collage of programming from several other stations such as KNBS, Radio Beaver, and Radio USA. Addr: Merlin. (Murphy)

**Voice of Anarchy**- 7416 at 0200. Their low key announcer Leonard Longwire has a unique format. Virtually every program highlights a different musical style. Addr: Blue Ridge Summit. (Scott Krauss, Cleveland, Ohio, Gigi Lytle, Lubbock, TX)

**Voice of Bono**- 7415 at 0000. Veteran broadcaster Gary Daniels ran three different programs on New Year's Day. He combines rock and advocacy for radio programming diversity. Their interval signal is a yelping dog. Addr: Wellsville. (Ross, Lytle)

**Voice of the Laughing Idiot**- 7415 at 0530. The station's trademark is an interval signal of insanely hysterical laughter. But, their announcer has broadened his focus with really ancient rock music and fifty year old comedy such as Amos and Andy. Addr: None yet. (Seiden, Ape)

**WARI**- 7415 at 0445. Dr. Lobotomy's "Alternative Radio International" rock station has been quite active in recent months. Addr: Wellsville. (Ross, Murphy)

**WEED**- 7415 at 0300. This one offers many repeat broadcasts of its slick rock and drug advocacy shows. Addr: None, but announces a computer BBS at (708) 238-1901. (Schneider, Seiden)

**Wire Line Radio**- 7415 at 2330. Paul is very happy to report that the rock music from WLR became his first pirate logging! Addr: Blue Ridge Summit. (Paul Roales, Tulsa, OK)

**WKAR**- 7415 at 0230. The news from "Wisconsin Kick Ass Rock" is that during a program of Christmas music, they announced a maildrop, requesting \$1 with reports. Addr: Merlin. (David Ditlow, Los Angeles, CA)

**WSKY**- 7415 at 0600. The slick and lengthy rock oldies shows from Mike Richards, Stephanie Wells, and Doug Barley at "Whiskey Radio" are increasingly supplemented by conservative political commentary. Congrats to Ted, whose WSKY QSL was his first pirate verie in 16 years of DX! Addr: Wellsville. (Ted Gurley, Dallas, TX; Martin, Ross, Seiden, Krauss, Lytle, Murphy)

**WSRN**- 7415 at 0430. The Wisconsin Sick Radio Network played seasonal holiday music this year, and they also function as a relay for **WKAR**. Addr: Merlin. (Lytle, Murphy)

**YY Radio**- 7415 at 0200. Norm heard a short test from this new but still obscure station. It's unlisted in normal QSL sources, but they did announce an address. Addr: Blue Ridge Summit. (Norm Alexander, Diamond Springs, CA)

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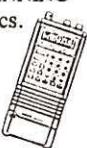
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**Saturday, October 16**

8:00 to 11:30 am  
Registration Open

9:00 am to 12:30 pm  
Exhibits Open and  
Morning Seminars

12:30 to 3:00 pm  
Exhibits Open and Lunch Break

**Saturday cont'd**

3:00 pm  
Exhibits Close

3:00 to 5:15 pm  
Afternoon Seminars

7:00 to 9:00 pm  
Banquet

9:00 pm  
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## A High Tech Story— A Close Encounter of the Weird Kind

Working as a technician in the telephone industry, I'm not an expert in the "High Tech" world of intelligence or espionage or code breaking. But, when reading RY's and Foxes becomes boring, I like to snoop around bands and check out the weird sounds.

Some of us have been fortunate enough to have the equipment and library resources to check out and sometimes discover new data modes. A handy book I recommend for your library is the *Radio Teletype Code Manual* by Joerg Klingenfuss (it's available from SWL outlets). It covers the technical aspects of various modes including Baudot, ARQ, Third Shift Cyrillic and character equivalents of other languages. It also talks about piccolo and an introduction to cryptology.

### It's the 90's!

The truth is, you're not going to find RTTY news agencies or Embassy traffic like you did in the 70's. If your decoder can only copy 170/45 RTTY, the best bet is to stick to the ham bands where you can find an abundance of it in the clear. The hobby has changed; therefore, you need to change your habits. If you can save your pennies, purchase a new decoder like the M6000, 7000 or 8000. All mode packet modems aren't designed to handle the full range of modes that you'll find on the HF bands in the 90's.

To help you understand what I do with the hobby, I'd like to tell you a story about a typical encounter that I had last January.

While snooping around the 3 MHz band (my normal routine in the evenings is to scan from about 2 to 15 MHz), I came across an FSK signal that was rather interesting. I discovered it with the aid of my M8000 and the newly installed bow tie filter circuit. The signal was sending, according to the M8000, a rate of 100 baud and 130 Hz shift on 3239 and 3245 kHz.

But I noticed something unusual on the Tektronix 604 monitor oscilloscope, which I use as an X/Y tuning scope with the M8000. Using the bow tie filter, I got something that looked like a crooked bow tie instead of the normal "crossed

footballs." There appeared to be a diagonal line "about 45 degrees" that appeared to be brighter than the normal bow tie transitions. See Figure 1.

At first I thought the signal was MSK (minimum shift keying). MSK is used in the VLF bands and in FDM channels on HF and produces the same illusion. I remember reading a book that defined MSK as a signal that uses a baud rate that is twice the shift. But the M8000 measured the speed at 100 baud and the shift was 130.

I went to my workbench and grabbed a Tektronix 465 oscilloscope. After connecting a second O-scope to the proper test point (U70 pin 8) on the M8000, I was able to do a signal analysis of the detected FSK signal. I saw a signal that looks like the one below.

About a year ago, a reader sent me some technical information on MSK. After examining the examples that were shown, I came to the conclusion that the signal was not MSK.

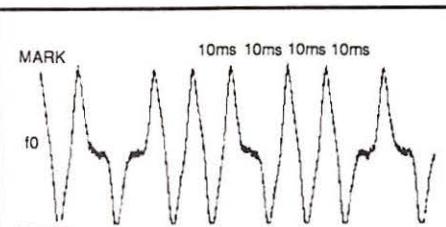


Fig. 2: The decoded three tone signal was captured using a modified Tandy 1000TL computer connected to a Universal M8000 at IC U70 Pin 8

The next logical conclusion was that it must be some sort of RTZ signal. RTZ or "return to zero" is a signal format that's normally used in the telecommunications industry to send a data signal over cable. At one moment the signal swings positive and returns to zero. The next time the signal swings negative, then back to zero again.

If you look carefully at Figure 2, you will notice that the trace swings from "M" to "S" and other times it goes from "M" to f0 or "S" to f0. It certainly rules out RTZ.

The only other conclusion is that it's either

a three tone system, or "M" is a logic 1 and "S" is a logic 1 and "f0" is a logic 0. The second choice would work very well because it would be very easy to extract clocking information from the signal.

With normal RTTY the data is asynchronous and it contains start and stop pulses. Synchronous data doesn't use start and stop elements. The military uses it because it's more efficient, but both ends of the link (transmit and receive) need to be timed to a common clock source. But with a government channel, that's no problem! They can establish their own time standard and keep all their transmitters on frequency and all of the data in perfect unison.

I believe that signal on 3245 sends its own clock. Notice that it always alternates from Mark to Space even if it occasionally stops at f0. The signal almost looks like a perfect sine wave; in fact, a phase-lock-loop circuit can lock to it and provide an accurate clock even though the same signal is used to send data.

But how is the data extracted? Is it ASCII, Baudot, or is it ARQ? Code busting not only requires that you figure out the modulation scheme, you need to determine the coding of the data. I guess, in the 90's, the Radio Hackers will have plenty to do! You never know, maybe this, too, will be included in the M9000.

### News Tidbits

Other unidentified signals were found on 4464 and 4619 kHz. They sound like ARQ-E3 or ARQ-E but neither mode will sync up to the signal.

I received reports from readers on the east coast that they're copying RTTY from one of SATCOM satellites on 244.1 MHz. So far no one has been able to read it.

Another reader also reported that he attended the motion picture *Toys* starring Robin Williams. He said that RTTY was used as a sound effect for one of the scenes. He also said that he can't wait until the movie is out on home video so that he can play the tape into his M8000 and see if the text is readable!

NNN



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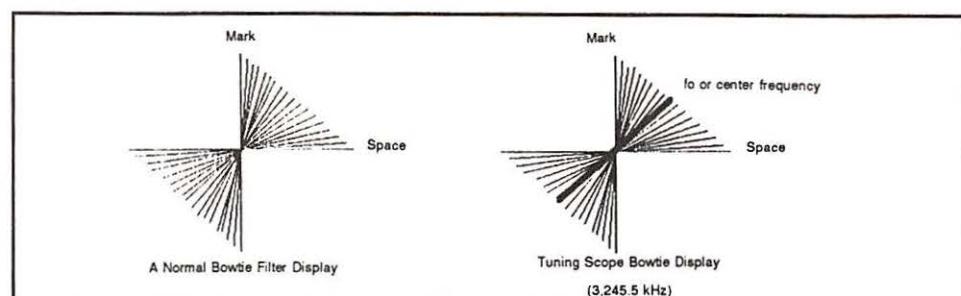


Figure 1

MONITORING TIMES

## It's Later Than You Think...

Effective July 1, 1993, the world of shortwave radio will lose another friend of the airwaves. Trans World Radio Bonaire's shortwave service will cease broadcasting, and turn their focus to their 800 kHz mediumwave outlet.

TRW's last QSL will be a full-data map card and minimum requirement for QSLs include: Date and Time, including start and finish times, preferably in UTC, frequency (within 50 kHz) and proof of reception.

Reception proof includes SINPO codes of reception conditions, and distinctive program notes of at least fifteen minutes; however, word-for-word reports are not wanted. IRCs and mint stamps are not required but are appreciated. Send reports to: Bonaire, Netherlands Antilles.

Ready for an address update? Here are two to add to your collection. WEWN/Eternal Word Network, P.O. Box 380247, Birmingham, AL 35238. KJES, The Lord's Ranch, Star Route 300, Mesquite, NM 88048.

KNLS is offering a free 32-page booklet titled *DX Tips for Beginners*. Topics include propagation, logbooks, QSLs, and receivers. Send your request to: Anchor Point, AK 99556.

### COSTA RICA

Faro Del Caribe, 5055 kHz. Full data station card and info sheet, verified by Juan Jacinto Ochoa, Sta. Manager. Received in 27 days for an English report, an audio cassette report, and mint stamps. Station address: Box 2710-1000, San Jose, Costa Rica. (Ed Rausch, Cedar Grove, NJ)

### FRANCE

Radio France Int'l, 25820 kHz. Full data scenery card, without veri signer. Received in 5 weeks for an English report. Station address: Boite Postal 9516, Paris, France. (Thomas Risher, Whittier, CA)

### FRENCH GUIANA

Radio Japan Relay, 15325 kHz. Full data Cherry Blossoms card, signed by Mr. K. Hishikawa via Montsinery. Pocket UTC/local time converter included. Received for an English report. Station address: 2-2-1 Jinnan, Shibuya-ku, Tokyo, Japan. (Mike Hardester, Jacksonville, NC)

### GERMANY

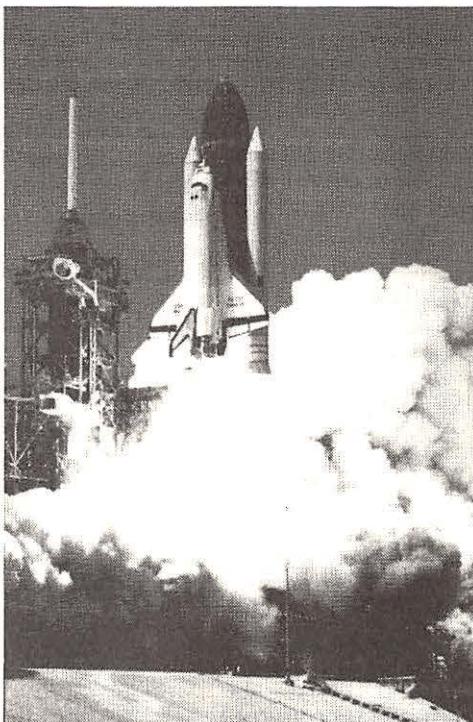
Sender Fries Berlin, 6190 kHz. Full data scenery card, without veri signer. Received in 14 days for an English report and mint stamps. Station address: Masurenallee 8-14, D-1000 Berlin 19, Germany. (Rausch, NJ)

### HONDURAS

La Voz Evangelica, 4820 kHz. No data station card, and program schedule, verified by Hermann Lagos Naira. Received in 45 days for an English report and mint stamps (returned). Station address: Apartado Postal 3252, Tegucigalpa DC, Honduras. (Rausch, NJ)

### ITALY

Stazione Radio Costiera P.T.-IQX, 12975 kHz. Received frequency only letter, with illegible veri



*This VOA QSL from a few years back highlights the NASA Space Shuttle program.*

signer. Received for an English utility report, address label, and mint stamps. Station address: 34100 Trieste, Direzione: Via Bellavista 4, Italy (Hardester, NC)

### NORWAY

Radio Norway Int'l, 9645 kHz. Full data card without veri signer. Also included station stickers, and a personal letter. Received in 30 days for an English report. Station address: Utgitt Av Utenlandssendingen, NRK N-0340 Oslo, Norway. (Richard A. Jones, Dayton, OH)

### RUSSIA

Radio Moscow Int'l, 15375 kHz. Full data card, without veri signer. Also included schedules, mint stamps, personal letter, stickers, and souvenir postcards. Received in 57 days for an English report. Station address: c/o External Services, Pyainitskaya 25, 113326, Moscow, Russia. (Jones, OH)

### SHIP TRAFFIC

SUNNY BLOSSOM-C6IE2, 156.500 MHz (Chemical Tanker). Full data prepared QSL card verified with ship's stamp and seal. Received in 71 days for an English utility report, one IRC, U.S. mint stamps, and a self-addressed-envelope. Station address: c/o V. Ships (UK) Ltd., 605 Third Ave., New York, NY 10158. (Russ Hill, Oak Park, MI)

ATLANTIC HURON-VCSP, 156.600 MHz (Bulk Carrier). Full data prepared QSL card verified by Radio Officer, and ship's stamp. Radio fact sheet received. Received in 28 days for an English utility report, one IRC (returned), mint U.S. and Canadian stamps, and a self-addressed-envelope. Station address: c/o CSL Group, 759 Victoria Sq., P.O. Box 100, Montreal, Quebec, H2Y 2K3 Canada. (Hill, MI)

USS EMORY S. LAND-NEXS, 156.65/156.6 MHz. (AS-39) Full data prepared QSL verified by Radio Officer. Received in 12 days for an English utility report and U.S. mint stamps. Station address: FPO New York, NY 09545. (Hank Holbrook, Dunkirk, MD)

MORMACSUN-WMBK, 156.65 MHz. (Tanker). Full data prepared QSL card verified by Radio Officer. Received in 47 days for an English utility report, and U.S. mint stamps. Station address: Mormas Marine Transport, Inc., Three Landmark Square, Stamford, Ct. 06901. (Holbrook, MD)

MORANIA NO. 5-WUS4896, 156.65 MHz. (Tug). Full data prepared QSL card verified by Radio Officer. Received in 8 days for an English utility report and U.S. mint stamps. Station address: Morania Oil Tanker Corp., 4 Stamford Forum, Stamford, CT 06901. (Holbrook, MD)

### UNITED STATES

NASA Shuttle-STS-45, Amateur Radio Experiment, 14295 kHz. Via W3NAN/144-146 MHz Mode: F3. Full data QSL card, without veri signer. Information sheet on SAREX and nice pictures of shuttle, earth, and astronauts. Received in eight months for an English utility report and a stamped-self-addressed-envelope. QSL address: SAREX STS-45, ARRL QSL Bureau, Call Box 599, Sterling, VA 20167. (David Sheley, Blytheville, AR)

WTAK-AM 1000 kHz, Huntsville, Alabama. Full data prepared QSL verified, with illegible veri signature. Received for an English AM follow-up report from 1991. Station address: WTAK-AM 1000, 6420 Stringfield Rd., Huntsville, AL 35806. (Hardester, NC)

WJCR, 7490 kHz. Full data station card, and sticker, verified by Gerri Powell. Received in 24 days for an English report. Station address: P.O. Box 91, Upton, KY 42784. (Richard A. Jones, Dayton, OH) (Raymond King, Kelowna, BC Canada)

NMK-USCG Group Cape May, 5692 kHz. Full data prepared QSL card verified by S.A. Nystrom-RMC. Received in 17 days for an English utility report and a stamped-self-addressed-envelope. Station address: USCG Group, Cape May, NJ 08204-5082. (Hill, MI)

NOK-USCG Group Key West, 5320 kHz. Full data prepared QSL card verified by Charles E. Comer-RM1, COMCEN Supv. Received in 17 days for an English utility report, a stamped-self-addressed-envelope. Station address: USCG Base, Key West, FL 33040. (Hill, MI)

NMA10-USCG Group Mayport, 2670 kHz. Full data letter, verified by G.K. Harris-RIC. Received in eight months for an English utility report and a stamped-self-addressed-envelope. Station address: Coast Guard Group, P.O. 385, Mayport, FL 32267. (Rausch, NJ)

VOA-Greenville, NC, 5995 kHz. Full data QSL card, without veri signer. Included sticker and '93 calendar. Received in 15 days for an English report. Station address: VOA Greenville Relay Sta., P.O. Box 1826, Greenville, NC 27834. (Jones, OH)

### YUGOSLAVIA

Radio Yugoslavia, 11870 kHz. Full data scenery card, without veri signer. Received in 110 days via surface mail, for an English report and 3 IRCs. Noted return was sent surface mail for economic reasons. Station address: P.O. Box 200, Hilendarska 2, 11000 Belgrade, Yugoslavia. (Glenn R. Bowman, Alexandria, VA)

## How to Use the Shortwave Guide

**1: Convert your time to UTC.**

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Standard Time) 5, 6, 7, or 8 hours for Eastern, Central, Mountain, or Pacific Time, respectively.

Note that all dates, as well as times, are in UTC: for example, the BBC's "Ken Bruce Show" (0030 UTC Sunday) will be heard on Saturday evening (7:30 PM Eastern, 4:30 PM Pacific) in North America, not on Sunday.

**2: Choose a program or station you want to hear.**

Some selected programs appear on the lower half of the page for prime listening hours. If it's news you're interested in, check out the complete "Newline" listing, which begins on the next page.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a re-run, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday	W: Wednesday	A: Saturday
M: Monday	H: Thursday	
T: Tuesday	F: Friday	

**3: Find the frequencies for the program or station you want to hear.**

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz..

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

**4: Choose the most promising frequencies for the time, location, and conditions.**

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am:	The Americas	me:	Middle East
na:	North America	as:	Asia
ca:	Central America	au:	Australia
sa:	South America	pa:	Pacific
eu:	Europe	va:	various
af:	Africa	do:	domestic broadcast
me:	Middle East	om:	omnidirectional

Consult the propagation charts. To further help you find the right frequency, we've included propagation charts at the back of this section, which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

## Hot News and Hot Spots

## Calling For Unity

Radio National Unity from Omdurman, Sudan, is once again active. They can be found on the out of band frequency of 9170 with a half hour of English from 1500 to 1530 UTC.

Given the current unrest in Sudan, this station makes for some very interesting listening. Expect to hear impassioned speech calling for national peace and unity among the warring factions of Sudan, set to the theme music of *Hawaii 5-0*!

Strong signals have been monitored on the West Coast of North America, with slight interference from the lower powered co-channel, CPBS in Beijing, China.

## January Rare Catch

If you were lucky enough to tune in the frequency of 15425 around 0100 UTC in mid-January, you would have noticed that Radio Moscow's regularly scheduled World Service to North America was missing. In its place was the more elusive Sri Lanka Broadcasting Corporation with its external service to Asia in English.

Programming consisted of light pop music from the 70s and 80s, with dozens of listeners' dedications, some from as far away as Kuwait

and Iran, but most originating from Bangalore, India.

## New Program for DXers

Radio station KNLS has announced in its recent newsletter the formation of a new English language DX program entitled, *Radio Today*. They are actively seeking listener-supplied shortwave station reception information. If you would like to participate, then send your listening suggestions to *Radio Today* in care of KNLS, Anchor Point, Alaska, 99556, USA. And while you're at it, you can request a copy of their free booklet, *DX Tips for Beginners*, written by Carl Mann.

## VOA Adjusts to Political Realities

Russ Feingold, new Democratic Senator from Wisconsin, has submitted his first bill, the "Overseas Broadcasting Consolidation and Deficit Reduction Act." The cost-cutting bill would consolidate Radio Free Europe and Radio Liberty with the Voice of America. It would also kill Worldnet and TV Marti, though it would keep Radio Marti. "The United States quite simply cannot afford to continue these services," he said.

The VOA continues to adjust its services as circumstances require. Twenty-four hour broad-

casting has been reinstated to the Middle East. The VOA has also begun broadcasting 24 hours a day through the major Japanese cable radio operator, Osaka Usen.

Monitors have reported North Korean jamming on the VOA's twice daily Korean shortwave broadcasts. However, listeners in Seoul report that the Korean-language broadcasts are still understandable.

## Elementary Hygiene

WWCR is carrying public service announcements for a "boil your water/wash your hands" campaign initiated by the Project Saturn-Global international network. One goal of the new international satellite network is to eradicate cholera and dysentery, the most preventable and deadly disease affecting mankind.

We'd like your feedback on this month's "Shortwave Guide." All listings are alphabetized by start time only, which should make it easier to find broadcasting from a particular country. Station names are according to on-air identification in English.

Thanks for this month's "Hot News" go to David Datko of California, Dave Alpert of New York, Ken Mason of Washington, D.C., and Adam Lock of WWCR.

## MT Monitoring Team

P.O. Box 98, Brasstown, NC 28902-0098

**Greg Jordan**Frequency Manager  
*North Carolina***Jacques d'Avignon**Propagation Forecasts  
*Ontario, Canada***Kannon Shanmugam**Program Manager  
*Kansas***Dave Datko***California***B.W. Battin***New Mexico***John Carson***Oklahoma***Gayle Van Horn***Louisiana*April Deadline:  
February 26**Jim Frimmel***Texas*

## newline

"Newline" is your guide to news broadcasts on the air. • All broadcasts are world news reports unless followed by an asterisk, which means the broadcast is primarily national news. • All broadcasts are daily unless otherwise noted by the day codes.

0000 UTC <u>(7:00 PM EST, 4:00 PM PST)</u>	Radio New Zealand Int'l [M-A] Radio Prague Radio Sofia Radio Tashkent Radio Thailand Radio Ukraine Int'l Radiotelevisione Italiana RAE, Buenos Aires [T-A] SBC Radio 1, Singapore Spanish National Radio Voice of America Voice of Indonesia WWCR [T-A]	Christian Science Monitor [T-F] HCJB Radio Havana Cuba [T-S] Radio Moscow Radio Netherlands Radio Pakistan (Special English) Radio Portugal [T-A] Radio Tirana Radio Yugoslavia SLBC, Sri Lanka	0355 Radio Japan [M-F]	Deutsche Welle HCJB Kol Israel Radio Australia Radio Bahrain Radio Havana Cuba [T-S] Radio Japan Radio Lesotho Radio Moscow Radio New Zealand Int'l Radio Thailand SBC Radio 1, Singapore Spanish National Radio Voice of America ZNBC Radio, Lusaka
0005	0115	0245	0400 UTC <u>(11:00 PM EST, 8:00 PM PST)</u>	0510
Radio Pyongyang	Radio Havana Cuba* [T-S]	All India Radio (News Service)	BBC	China Radio Int'l*
0010	0125	Radio Finland [T-S]	Radio Prague	Radio Botswana [M-A]
China Radio Int'l*	Radio Korea [T-A]	0300 UTC <u>(10:00 PM EST, 7:00 PM PST)</u>	0515	Radio Havana Cuba* [T-S]
0030	0130	BBC	Radio Sofia	Radio For Peace Int'l [T-A]
All India Radio	Christian Science Monitor (as) [M]	CBC, Northern Quebec [T-S]	Radio Tanzania	0520
Christian Science Monitor (as) [M]	Christian Science Monitor [T-F]	Channel Africa, Johannesburg	Radio Thailand	Christian Science Monitor [T-F]
Christian Science Monitor [T-F]	FEBC Radio Int'l, Philippines	China Radio Int'l	Radio Finland [M-A]	
FEBC Radio Int'l, Philippines	Radio Austria Int'l	Christian Science Monitor	Radio Havana Cuba [T-S]	
HCJB	Radio Havana Cuba [T-S]	Deutsche Welle	Radio Moscow (World Service)	
Radio Havana Cuba [T-S]	Radio Netherlands	Radio Australia	Radio Romania Int'l	
Radio Korea	Radio Tirana	Radio Bahrain	Radio Thailand	
Radio Netherlands	Radio Yugoslavia	Radio Belize	RTM, Malaysia	
Radio Vlaanderen Int'l	Voice of Greece	Radio Budapest	UAE Radio, Dubai	
Voice of America (am,as)	Voice of Indonesia	Radio Havana Cuba [T-S]	Voice of Nigeria	
(Special English) [T-S]	WRNO [W, A]	Radio Japan	0545	
Voice of America (as) (Spec Eng)	0155	Radio Moscow	Voice of Nigeria*	
[M]	0200 UTC <u>(9:00 PM EST, 6:00 PM PST)</u>	Radio Prague	0600 UTC <u>(1:00 AM EST, 10:00 PM PST)</u>	
0035	BBC ("Newdesk")	SBC Radio 1, Singapore	BBC	
All India Radio (News Service)	CBC, Northern Quebec [S-M]	Voice of America	BBC (af)* [A-S]	
0045	Channel Africa, Johannesburg	Voice of Free China	CBC, Northern Quebec	
Radio Korea (News Service)	Christian Science Monitor	WWCR [T-A]	Channel Africa, Johannesburg	
0055	Croatian Radio, Zagreb [S]	0309	Christian Science Monitor	
WRNO [H, A]	Deutsche Welle	BBC*	Deutsche Welle	
0100 UTC <u>(8:00 PM EST, 5:00 PM PST)</u>	Radio Australia	0310	GBC Radio, Accra*	
BBC	Radio Canada Int'l [T-A]	China Radio Int'l*	Radio Australia	
CBC, Northern Quebec	Radio Havana Cuba [T-S]	0315	Radio Bahrain	
Christian Science Monitor	Radio Moscow	Radio Cairo	Radio Havana Cuba [T-S]	
Croatian Radio, Zagreb [M-A]	Radio Netherland	Radio Havana Cuba* [T-S]	0445	
Deutsche Welle	Radio Netherlands	Radio Bahrain	Radio Bahrain	
Radio Australia	Radio UAE	Radio Austria Int'l [T-A]	Radio Havana Cuba [T-S]	
Radio Belize	Voice of Myanmar	Radio Bahrain	Radio Korea	
Radio Canada Int'l [S-M]	WWCR [T-A]	Radio Havana Cuba [T-S]	Radio Moscow	
Radio Havana Cuba [T-S]	Voice of Greece	Radio Netherlands	Radio New Zealand Int'l [M-F]	
Radio Japan	0215	Radio UAE	SBC Radio 1, Singapore	
Radio Moscow	Radio Cairo	Voice of Greece	Swiss Radio Int'l	
	Radio Nepal	0350		
	0230	Radio Yerevan		
	CScience Monitor (af,me) [M]	0455		
		WYFR (Network) [T-A]		
		0500 UTC <u>(12:00 AM EST, 9:00 PM PST)</u>		
		BBC ("Newshour")		
		CBC, Northern Quebec [T-S]		
		Channel Africa, Johannesburg		
		China Radio Int'l		
		Christian Science Monitor		

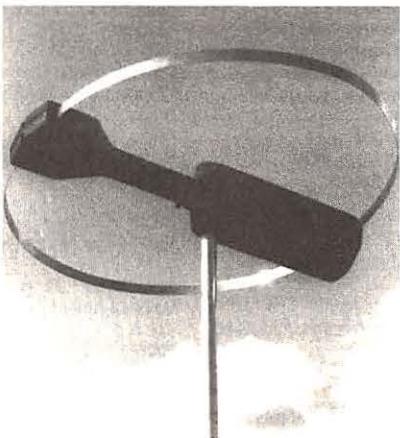
## newsline

Voice of America	ZNBC Radio 2, Lusaka [M-A]	1003	Radio Australia	Radio Canada Int'l (as)
Voice of Malaysia	0802	Croatian Radio, Zagreb [S]	Radio Bahrain	Radio Finland [M-F]
ZNBC Radio, Lusaka [M-A]	Radio Botswana	1010	Radio Jordan	Radio Moscow
0605	0803	China Radio Int'l*	Radio Moscow	Radio Netherlands
Radio Pyongyang	Croatian Radio, Zagreb [S]	1025	Radio Nacional do Brasil [M-A]	Radio Tashkent
0609	0805	Radio New Zealand Int'l* [M-F]	Radio New Zealand Int'l [S-F]	RTM, Malaysia
BBC*	Radio Pyongyang	1030	Radio Tashkent	UAE Radio, Dubai
0615	0830	Christian Science Monitor [M-F]	Radio Thailand	Voice of America (Spec Eng)
Radio Canada Int'l [M-F]	All India Radio (News Service)	MBC, Blantyre [M-F]	RTM, Malaysia	Voice of Turkey
0630	Christian Science Monitor [M-F]	Radio Austria Int'l [M-F]	SBC Radio 1, Singapore	1346
BBC (af)* [M-F]	Radio Moscow (World Service)	Radio Korea	SLBC, Sri Lanka	All India Radio [A]
Christian Science Monitor [M-F]	Radio Netherlands	Radio Moscow	Voice of America	1355
Radio Austria Int'l	0840	RTM, Malaysia	WWCR [M-A]	WYFR (Network) [M-F]
Radio Havana Cuba [T-S]	Voice of Greece [M-A]	UAE Radio, Dubai	1210	<b>1400 UTC</b>
Radio Moscow (World Service)	0850	Voice of Nigeria	China Radio Int'l*	<b>(9:00 AM EST, 6:00 AM PST)</b>
Radio Romania Int'l	All India Radio (News Service)	1040	1215	BBC
RTV Congolaise, Brazzaville [M-F]	(Special English)	Voice of Greece [M-A]	HCJB [M-F]	CBC, Northern Quebec
Voice of Nigeria	Radio Pacific Ocean [A]	1055	Radio Korea	China Radio Int'l
0645	0855	All India Radio	1225	Christian Science Monitor
Radio Romania Int'l	Radio Korea [M-F]	1100 UTC	WYFR (Network) [M-F]	GBC Radio, Accra
Voice of Nigeria*	Voice of Indonesia	(6:00 AM EST, 3:00 AM PST)	1230	All India Radio (News Service)
0650	0900 UTC	BBC ("Newsdesk")	Christian Science Monitor [M-F]	Kol Israel [S-H]
Radio New Zealand Int'l* [M-F]	(4:00 AM EST, 1:00 AM PST)	Channel Africa, Johannesburg	Radio Austria Int'l [M-F]	LBS, Monrovia
0655	BBC	Christian Science Monitor	Radio Cairo	MBC, Blantyre [M-F]
Radio Korea [M-F]	China Radio Int'l	Deutsche Welle	Radio Finland [M-F]	Radio Australia
<b>0700 UTC</b>	Christian Science Monitor	GBC Radio, Accra [A-S]	Radio France Int'l	Radio Bahrain
<b>(2:00 AM EST, 11:00 PM PST)</b>	Deutsche Welle	Kol Israel	Radio Moscow	Radio Belize [M-F]
BBC ("Newsdesk")	GBC Radio 1, Accra [M-F]	MBC, Blantyre [A-S]	Radio Netherlands	Radio Canada Int'l [S]
Christian Science Monitor	GBC Radio 2, Accra	Radio Australia	Radio Vlaanderen Int'l [S]	Radio France Int'l
GBC Radio, Accra	LBS, Monrovia	Radio Bahrain	Radio Yugoslavia	Radio Iraq Int'l
LBS, Monrovia	MBC, Blantyre M-A	Radio Japan	SLBC, Sri Lanka	Radio Japan
MBC, Blantyre [M-A]	Radio Australia	Radio Korea	Radio Jordan	Radio Jordan
Radio Australia	Radio Bahrain	Radio Moscow	Radio Korea	Radio Liberia
Radio Japan	Radio Japan	Radio New Zealand Int'l [M-F]	Voice of Greece	Radio Moscow
Radio Liberia	Radio Liberia	Radio Pakistan	1245	Radio Vlaanderen Int'l [M-A]
Radio Moscow	Radio Moscow	SBC Radio 1, Singapore	SLBC, Sri Lanka	RTM, Malaysia*
Radio New Zealand Int'l [S-F]	Radio New Zealand Int'l [S]	Swiss Radio Int'l	1255	SBC Radio 1, Singapore
Radio Prague	SBC Radio 1, Singapore	TWR, Bonaire [M-F]	WYFR (Network) [M-F]	Voice of America
SBC Radio 1, Singapore	Swiss Radio Int'l	Voice of America	1257	ZNBC Radio 2, Lusaka [M-F]
SLBS, Freetown	Voice of Nigeria	WWCR [M-F]	HCJB [M-F]	1410
Voice of Free China	0903	WYFR (Network) [M-F]	1258	China Radio Int'l*
Voice of Myanmar	Croatian Radio, Zagreb [M-A]	ZNBC Radio, Lusaka	Africa Number One, Libreville	1415
<b>0703</b>	0910	1105	1300 UTC	LBS, Monrovia (Special English)
Croatian Radio, Zagreb [M-A]	China Radio Int'l*	Radio Pakistan (Special English)	(8:00 AM EST, 5:00 AM PST)	Radio Korea (News Service)
0705	0915	Radio Pyongyang	BBC ("Newshour")	Radio Nepal
Radio Pyongyang	Radio Korea (News Service)	1110	CBC, Northern Quebec [A-S]	1425
0730	0930	Radio Belize [T-A]	China Radio Int'l	HCJB [M-F]
All India Radio (News Service)	All India Radio (News Service)	Radio Botswana [M-F]	Christian Science Monitor	LBS, Monrovia
BBC (af)* [A]	Christian Science Monitor [M-F]	Radio Korea (News Service)	GBC Radio, Accra	1430
Christian Science Monitor [M-F]	Christian Science Monitor [M-F]	Radio Nepal	Polish Radio, Warsaw	All India Radio (News Service)
HCJB	Deutsche Welle (af)* [M-F]	1125	Radio Australia	Christian Science Monitor [M-F]
Radio Ghana	FEBC Radio Int'l, Philippines	Radio Belize [M]	Radio Bahrain	FEBC Radio Int'l, Philippines
Radio Moscow (World Service)	Radio Afghanistan	Radio Botswana [A-S]	Radio Belize	Radio Finland [M-A]
Radio Netherlands	Radio Moscow	1130	Radio Canada Int'l (na) [M-F]	Radio Moscow
Radio Prague	Radio Netherlands	Christian Science Monitor [M-F]	Radio Moscow	Radio Netherlands
Radio Vlaanderen Int'l	0940	Deutsche Welle* [M-F]	Radio Romania Int'l	Radio Romania Int'l
0745	Radio Togo	Radio Lesotho	Radio Tanzania [A-S]	1440
Radio Finland [M-A]	0955	Radio Moscow	SBC Radio 1, Singapore	FEBC Radio Int'l, Philippines* [M-F]
0750	Radio Japan [M-F]	Radio Netherlands	Swiss Radio Int'l	1445
Radio For Peace Int'l [T-A]	<b>1000 UTC</b>	Radio Prague	Voice of America	BBC (as) (Special English) [M-F]
0755	(5:00 AM EST, 2:00 AM PST)	Radio Sofia	1303	Voice of Myanmar
Radio Japan [M-F]	All India Radio	Radio Thailand	Croatian Radio, Zagreb	1455
<b>0800 UTC</b>	BBC	RTM, Malaysia*	1305	All India Radio
<b>(3:00 AM EST, 12:00 AM PST)</b>	Channel Africa, Johannesburg	1135	Radio Pyongyang	Radio Korea [M-F]
BBC	China Radio Int'l	All India Radio (News Service)	1310	<b>1500 UTC</b>
Christian Science Monitor	Christian Science Monitor	1150	China Radio Int'l*	<b>(10:00 AM EST, 7:00 AM PST)</b>
GBC Radio 1, Accra [S]	GBC Radio 2, Accra [A]	Channel Africa, Johannesburg	Radio Korea [M-F]	BBC
GBC Radio 2, Accra	HCJB	1155	1320	CBC, Northern Quebec [A-S]
MBC, Blantyre [S]	MBC, Blantyre [S]	Radio Japan [M-F]	Radio For Peace Int'l [T-A]	China Radio Int'l
Radio Australia	Radio Australia	Radio Korea [M-F]	SLBC, Sri Lanka	Christian Science Monitor
Radio Bahrain	Radio Bahrain	<b>1200 UTC</b>	1325	Deutsche Welle
Radio Korea	Radio Moscow	(7:00 AM EST, 4:00 AM PST)	HCJB [M-F]	GBC Radio 2, Accra
Radio Moscow	Radio New Zealand Int'l [M-F]	BBC	1328	Radio Australia
Radio New Zealand Int'l [M-F]	Radio Tanzania	CBC, Northern Quebec [A-S]	Radio Cairo	Radio Bahrain
Radio Pakistan	Radio Vlaanderen Int'l [M-A]	China Radio Int'l	1330	Radio Belize [M-A]
SBC Radio 1, Singapore	SBC Radio 1, Singapore	Christian Science Monitor	All India Radio	Radio Canada Int'l (na) [S]
SLBS, Freetown	Voice of America	LBS, Monrovia	FEBC Radio Int'l, Philippines	Radio Japan
Voice of Indonesia	ZNBC Radio 2, Lusaka [M-A]	MBC, Blantyre [M-F]	Radio Austria Int'l [M-F]	Radio Moscow
Voice of Malaysia				

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This is the one that gives you freedom of speech, whether you have to deal with restrictive covenants at home or in your apartment or condo, or if you are traveling in your boat, car, or RV. It features 150 watts, continuous coverage from 10 to 30 MHz, narrow bandwidth to suppress out-of-band signals. The IsoLoop antenna comes fully assembled with no mechanical joints. There is simply no better value in antennas!



## PK-232MBX DIGITAL MULTI-MODE CONTROLLER.

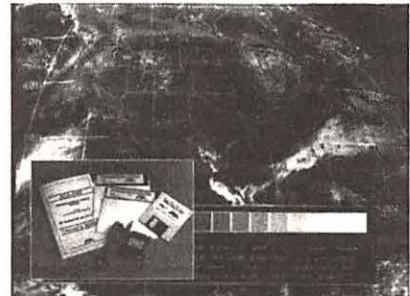
It can receive eight different types of data signals, including Morse code, Baudot, ASCII, Time Division Multiplex (TDM), WEFAX, NAVTEX, Packet and AMTOR. Also featured is SIAM which automatically identifies many types of digital signals, excellent software support for PC compatibles, Macintosh and Commodore 64 & 128 computers. This unit is essential for the serious digital listener.



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PO Box C2160, 2006 - 196th St. SW, Lynnwood, WA 98036 Sales: (206) 774-5554

## newsline

Radio Omdurman, Sudan	HCJB [M-F]	Radio Belize	Radio Belize [M-F]	GBC Radio 2, Accra
Radio Portugal [M-F]	Radio Austria Int'l [M-F]	Radio Kuwait	Radio Canada Int'l	MBC, Blantyre
RTM, Malaysia	Radio Canada Int'l (as)	Radio Mogadishu	Radio Moscow	Radio Australia
SBC Radio 1, Singapore	Radio Moscow	Radio Moscow	Radio New Zealand Int'l [S-F]	Radio Budapest
SLBC, Sri Lanka	UAE Radio, Dubai	Radio Netherlands	Radio Portugal [M-F]	Radio Canada Int'l
Swiss Radio Int'l	Voice of America (eu) (Spec Eng)	Radio Sofia	Radio Vilnius	Radio Havana Cuba [M-A]
Voice of America	<b>1655</b>	Voice of America (Spec Eng)	SLBS, Freetown	Radio Iraq Int'l
Voice of Ethiopia	Radio Korea [M-F]	<b>1835</b>	Swiss Radio Int'l	Radio Moscow
WWCR [M-F]		Radio New Zealand Int'l* [F]	Voice of America	Radio New Zealand Int'l [A-H]
<b>1502</b>	<b>1700 UTC</b>	<b>1840</b>	Voice of Indonesia	Radio Prague
Radio Finland [M-A]	<b>(12:00 PM EST, 9:00 AM PST)</b>	Voice of Greece	Voice of Nigeria	Radio Tirana
<b>1505</b>	BBC	<b>1845</b>	ZNBC Radio 2, Lusaka	Radio Ukraine Int'l
Radio Pyongyang	CBC, Northern Quebec [A]	BSKSA, Riyadh*	<b>2002</b>	Radio Vlaanderen Int'l
<b>1510</b>	Channel Africa, Johannesburg	Radio Cote d' Ivoire	Radio Botswana	Radio Yugoslavia
China Radio Int'l*	China Radio Int'l	Radio Guinea, Conakry	<b>2005</b>	Radiotelevisione Italiana
<b>1515</b>	Christian Science Monitor	<b>1855</b>	Radio Pyongyang	SBC Radio 1, Singapore
Radio Canada Int'l (eu)	GBC Radio 2, Accra	Radio New Zealand Int'l* [S-H]	<b>2010</b>	SLBS, Freetown
<b>1520</b>	Radio Australia	Radio Omdurman, Sudan	China Radio Int'l*	Swiss Radio Int'l
Voice of Greece	Radio Bahrain	<b>1857</b>	Radio New Zealand Int'l* [S-H]	Voice of America
<b>1525</b>	Radio Belize [M-F]	BBC (af)* [M-F]	<b>2025</b>	Voice of Free China
Radio Veritas Asia [T-F]	Radio Canada Int'l	<b>1900 UTC</b>	Radiotelevisione Italiana	<b>2203</b>
<b>1530</b>	Radio Japan	<b>(2:00 PM EST, 11:00 AM PST)</b>	Christian Science Monitor [M-F]	Croatian Radio, Zagreb
All India Radio (News Service)	Radio Jordan	All India Radio	Polish Radio, Warsaw	<b>2209</b>
Christian Science Monitor [M-F]	Radio Moscow	BBC	Radio Moscow	BBC*
Deutsche Welle* [M-F]	Radio New Zealand Int'l [S-F]	CBC, Northern Quebec [M-H]	Radio Nacional de Angola	<b>2210</b>
FEBA, Seychelles	Radio Pakistan	China Radio Int'l	<b>2045</b>	BSKSA, Riyadh
FEBC Radio Int'l, Philippines	SLBC, Sri Lanka	Christian Science Monitor [M-A]	Radio Korea (News Service)	<b>2215</b>
Radio Austria Int'l	Swiss Radio Int'l	Deutsche Welle	Radio Sofia	Radio Finland [S-F]
Radio Moscow	Voice of America	GBC Radio 2, Accra*	<b>2055</b>	<b>2225</b>
Radio Netherlands	<b>1705</b>	Radio Canada Int'l [M-F]	Voice of Indonesia	Radio Havana Cuba* [M-A]
Radio Tirana	Radio Pyongyang	Radio Japan	<b>2100 UTC</b>	<b>2230</b>
Voice of Ethiopia	<b>1710</b>	Radio Korea	<b>(4:00 PM EST, 1:00 PM PST)</b>	Christian Science Monitor [M-F]
Voice of Nigeria	China Radio Int'l*	Radio Liberia	All India Radio	Kol Israel
<b>1540</b>	<b>1715</b>	Radio Moscow	BBC ("Newshour")	Radio Havana Cuba [M-A]
Radio Veritas Asia [A-M]	Radio Korea (News Service)	Radio New Zealand Int'l* [S-F]	CBC, Northern Quebec [S-F]	Radio Moscow
Voice of Nigeria*	<b>1725</b>	Radio Portugal [M-F]	China Radio Int'l	Radio Vilnius
<b>1545</b>	Radio New Zealand Int'l* [M-F]	Radio Romania Int'l	Christian Science Monitor [M-A]	Voice of America (Spec Eng)
Radio Korea (News Service)	Radio Surinam Int'l [M-F]	Radio Vlaanderen Int'l	Deutsche Welle	<b>2240</b>
<b>1550</b>	<b>1730</b>	SLBS, Freetown	GBC Radio 2, Accra*	Radio Korea [M-F]
Radio For Peace Int'l [T-A]	All India Radio (News Service)	Spanish National Radio	KVOH	Voice of Greece
<b>1555</b>	Christian Science Monitor [M-F]	Voice of America	MBC, Blantyre	<b>2245</b>
Radio Veritas Asia [A-M]	Radio Moscow	<b>1903</b>	Radio Australia	GBC Radio, Accra
<b>1600 UTC</b>	Radio Netherlands	Voice of Greece	Radio Bahrain	Radio Sofia
<b>(11:00 AM EST, 8:00 AM PST)</b>	Radio Romania Int'l	<b>1910</b>	Radio Belize [M-F]	Radio Yerevan
BBC	<b>1740</b>	China Radio Int'l*	Radio Havana Cuba [M-A]	<b>2300 UTC</b>
CBC, Northern Quebec [A-S]	BBC (af)*	Radio Botswana	Radio Japan	<b>(6:00 PM EST, 3:00 PM PST)</b>
Channel Africa, Johannesburg	<b>1750</b>	<b>1930</b>	Radio Liberia	All India Radio
China Radio Int'l	Channel Africa, Johannesburg	BBC (af)* [S, F]	Radio Moscow	BBC
Christian Science Monitor	<b>1800 UTC</b>	Christian Science Monitor [M-F]	Radio New Zealand Int'l [A-H]	CBC, Northern Quebec [M-F]
Deutsche Welle	<b>(1:00 PM EST, 10:00 AM PST)</b>	Deutsche Welle* [M-F]	Radio Prague	Christian Science Monitor [M-A]
GBC Radio 2, Accra	All India Radio	Polish Radio, Warsaw	Radio Romania Int'l	Radio Australia
LBS, Monrovia	BBC ("Newsdesk")	Radio Austria Int'l	SLBS, Freetown	Radio Belize [M-F]
MBC, Blantyre	CBC, Northern Quebec [A]	Radio Finland [S-F]	Spanish National Radio	Radio Canada Int'l
Polish Radio, Warsaw	Christian Science Monitor	Radio Ghana	Voice of America	Radio Japan
Radio Australia	GBC Radio, Accra	Radio Moscow	Voice of Turkey	Radio Liberia
Radio Bahrain	Kol Israel	Radio Netherlands	ZNBC Radio 2, Lusaka	Radio Moscow
Radio Canada Int'l (na) [S]	KVOH	Radio Prague	Voice of America	Radio New Zealand Int'l
Radio France Int'l	MBC, Blantyre	Radio Yugoslavia	Voice of Turkey	RTM, Malaysia
Radio Jordan	Polish Radio, Warsaw	Voice of Nigeria	ZNBC Radio 2, Lusaka	SBC Radio 1, Singapore
Radio Korea	Radio Afghanistan	<b>1935</b>	<b>2110</b>	Voice of America
Radio Lesotho	Radio Australia	Radiotelevisione Italiana	China Radio Int'l*	Voice of Turkey
Radio Liberia	Radio Bahrain	<b>1945</b>	Radio New Zealand Int'l* [S-H]	<b>2305</b>
Radio Moscow	Radio Belize [M-F]	Radio Togo	Radio For Peace Int'l [M-F]	Radio Pyongyang
Radio Pakistan	Radio Canada Int'l	<b>1955</b>	<b>2120</b>	<b>2330</b>
Radio Tanzania	Radio Moscow	Radio Korea [M-F]	Radio For Peace Int'l [M-F]	Christian Science Monitor [M-F]
SBC Radio 1, Singapore	Radio Nacional do Brasil [M-A]	<b>2000 UTC</b>	<b>2125</b>	Radio Austria Int'l [M-F]
Voice of America	Radio New Zealand Int'l [S-F]	<b>(3:00 PM EST, 12:00 PM PST)</b>	Radio Havana Cuba* [M-A]	Radio Moscow
Yemen Radio	Radio Omdurman, Sudan	BBC	<b>2130</b>	Radio Nacional, Bogota [A]
ZNBC Radio 2, Lusaka [M-A]	Radio Prague	China Radio Int'l	Radio Cairo	Radio Netherlands
<b>1609</b>	Radio Tanzania	Christian Science Monitor	Radio Havana Cuba [M-A]	Radio New Zealand Int'l [S-H]
BBC*	RAE, Buenos Aires [M-F]	GBC Radio, Accra	Radio Moscow	RTM, Malaysia*
<b>1610</b>	Voice of America	Kol Israel	<b>2145</b>	<b>2335</b>
China Radio Int'l*	ZNBC Radio, Lusaka	KVOH	Radio Korea	Voice of Greece
Radio Botswana [M-F]	<b>1805</b>	Christian Science Monitor	<b>2200 UTC</b>	<b>2345</b>
<b>1615</b>	Radio New Zealand Int'l* [S-F]	GBC Radio, Accra	<b>(5:00 PM EST, 2:00 PM PST)</b>	Radio Yerevan
Radio Pakistan (Special English)	<b>1815</b>	Kol Israel	All India Radio	SLBC, Sri Lanka [M]
<b>1620</b>	ZNBC Radio 2, Lusaka*	KVOH	BBC	<b>2350</b>
Radio Tallinn [M-F]	<b>1830</b>	MBC, Blantyre	CBC, Northern Quebec [S-F]	Radio For Peace Int'l [M-F]
<b>1630</b>	BSKSA, Riyadh	Radio Australia	China Radio Int'l	<b>2355</b>
Christian Science Monitor [M-F]	Christian Science Monitor [M-F]	Radio Bahrain	Christian Science Monitor	Radio Japan [M-F]

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Connect the SDU-100 to any TTL monochrome monitor, or order the matching VID-100 9" CRT monitor. 12 VDC powered for mobile or field environment; AC adaptor included (the VID-100 is AC powered only).

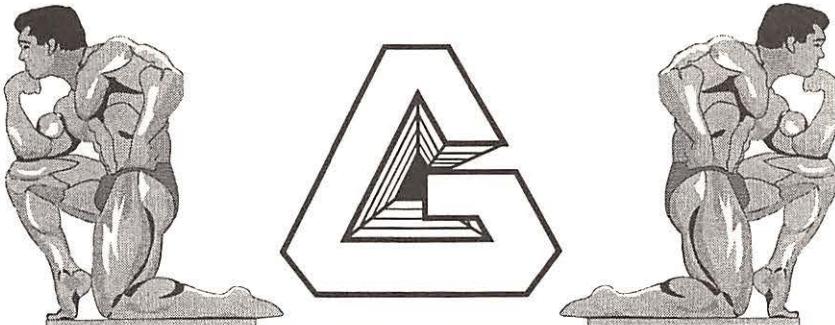
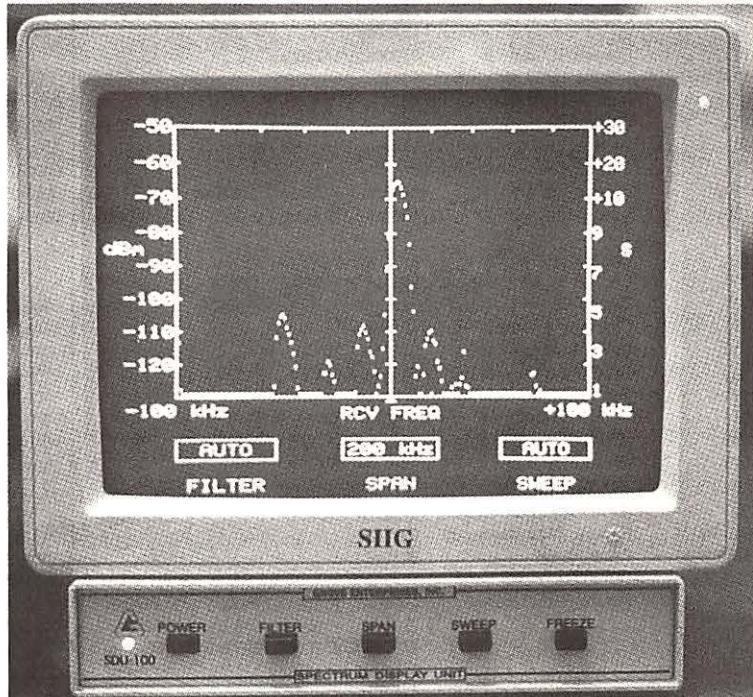
The SDU-100 can be configured to operate with a variety of receiver intermediate frequencies (IFs).

Specify your receiver or IF at time of order.

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VID-100 9" CRT Monitor \$149.95  
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**DISPLAY ACCURACY:** +/-3% or +/-3 dB, whichever is larger  
**RESOLUTION BANDWIDTH:** 5, 30 kHz  
**SWEEP TIME:** 0.1, 0.5, 2, 6 seconds  
**VIDEO OUTPUT:** TTL to optional monochrome monitor  
**MINIMUM DETECTABLE SIGNAL (MDS):** -130 dBm (nom.)  
**DISPLAY DYNAMIC RANGE:** 70 dB

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0000 UTC

[7:00 PM EST/4:00 PM PST]

## FREQUENCIES

0000-0100	Australia, ABC Brisbane	4920do	9660do		0000-030	Switzerland, Swiss R Intl	6135na	9650na	9885na	12035na	
0000-0100	Australia, ABC Perth	9610do			0000-0100	Thailand, Radio	9655as	11905as			
0000-0030	Australia, Radio	13605pa	15320va	15365pa	17630pa	0000-030	United Kingdom, BBC London	5975na	6005af	6175na	6195as
		17750as					7180as	7325na	7415as	9580as	
							9590na	9915na	11750na	11750sa	
0000-0100	Bulgaria, R Sofia	9700na	11720na				11945as	11955as	12095na	15070na	
0000-0100	Canada, CFCX Montreal	6005do			0000-0100	USA, CSMonitor Boston MA	5980na	9850af	13760sa	17555as	
0000-0100	Canada, CFRX Toronto	6070do			0000-0100 sa	USA, CSMonitor Boston MA	17865as				
0000-0100	Canada, CFVP Calgary	6030do			0000-0100	USA, KCBI Dallas TX	15725va				
0000-0100	Canada, CHNX Halifax	6130do			0000-0100	USA, KTBN Salt Lk City UT	7510am				
0000-0100	Canada, CKZU Vancouver	6160do			0000-0100	USA, KVOH Los Angeles CA	17775am				
0000-0030	Canada, RCI Montreal	5960am	9755am	13670am	0000-0100	USA, VOA Washington DC	5995am	6130as	7120as	7405am	
0000-0100	Canada, RCI Montreal	5960am	9535am	9755am	13720am		9455am	9770as	9775am	11580am	
							11695am	11760as	15120am	15185as	
0000-0100	China, China Radio Intl	9770na	11715na				15260sa	15280va	15360pa	17830as	
0000-0100	Costa Rica, AWR Alajuela	9725ca	11870ca	13750ca			15290as	17735as		17820as	
0000-0100	Costa Rica, RFPI Santa Ana	7375na	7385na	13630na	15030na	0000-0100	USA, WHRI Noblesville IN	7315na			
0000-0030 a	Croatian Radio via WHRI	7315na				0000-0100	USA, WINB Red Lion PA	15145eu			
0000-0100	Cuba, Radio Havana Cuba	6010na	9815na			0000-0100	USA, WJCR Upton KY	7490na	13595na		
0000-0027	Czechoslovakia, Radio	7345na	9580na	11990na		0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100	Guam, KSDA	15610as				0000-0100	USA, WWCR Nashville TN	7435na	13845na		
0000-0045	India, All India Radio	9910as	11715as	11745as	15110as	0000-0100	USA, WYFR Okeechobee FL	5985am	6065na		
0000-0030	Lithuania, Radio Vilnius	7150na	7440na	17605na	17690na	0010-0020 irreg	USA, WEWN Birmingham AL	17725na			
0000-0025	Netherlands, Radio	6020na	6165na			0030-0100	Australia, Radio	15240pa	15320va	15365pa	17630as
0000-0100	New Zealand, R NZ Intl	17770pa					17715pa	17750as	17795pa	17880as	
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na			21740pa	21775as			
0000-0030 sm	Norway, Radio Norway Intl	9645am				0030-0100	Belgium, R Vlaanderen	9930na	13655sa		
0000-0100	Palau, KHBN	9830va				0030-0100	Canada, RCI Montreal	5960am	9755am		
0000-0100	Philippines, FEBC Manila	15450as				0030-0100	Ecuador, HCJB Quito	9745am	15155am	21455am	
0000-0100	Russia, Radio Moscow	6000na	7115na	7150na	7170va	0030-0100	Iran, VOIR Tehran	9022am	11790am	15260am	
		7220va	7295va	9685va	9725va	0030-0100	Netherlands, Radio	6020na	6165na	9860as	11655as
		9750va	9870na	9890va	12050na		11835na	15560na			
		15425va	15455va	17570va	17655na	0030-0100	South Korea, Radio Korea	15575am			
		17890va	21480na			0030-0100	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	
0000-0100	S Africa, Radio Orion	4810do				0030-0100	United Kingdom, BBC London	5965as	5975na	6005sa	6175na
0000-0100	Singapore, SBC1	5010do	5052do	11940do				7135as	7325na	9580as	9590na
0000-0100	South Korea, Radio Korea	15575am					9915na	11750sa	11955as	12095na	
0000-0100	Spain, Spanish Natl Radio	9530na				0035-0040	India, All India Radio	15260sa	15280va	15360pa	17890va
							4860do	5120as	11920as		

## SELECTED PROGRAMS

## Sundays

0005 Christian Science Monitor: Christian Science Sentinel. Religious programming explaining the doctrine of Christian Science.  
 0015 China Radio Int'l: Press Clippings. A review of the Chinese press.  
 0020 China Radio Int'l: Travel Talk. An armchair tour of scenic spots in Chinese provinces.  
 0028 China Radio Int'l: Cooking Show. The Beijing Frugal Gourmet.  
 0030 BBC: The Ken Bruce Show. Ken Bruce plays the latest releases, from pop to jazz to country.  
 0035 China Radio Int'l: Music From China. Chinese music, from traditional to pop.  
 0035 Radio Netherlands: Newsline. News analysis from correspondents worldwide.  
 0050 Radio Netherlands: Sounds Interesting. Listener feedback and the sights and sounds of Holland.

## Mondays

0005 Christian Science Monitor (am,af): The Sunday Service. See S 1605.  
 0006 Christian Science Monitor (as): News Features And Interviews. In-depth news analyses, focusing on major international events.  
 0015 China Radio Int'l: Sports Beat. See S 1215.  
 0020 China Radio Int'l: China Anthology. See S 1220.  
 0028 China Radio Int'l: Music Album. See S 1228.  
 0030 BBC: In Praise Of God. Christian religious services and meditations. This month: "The Pains Of Glass" comes from

## King's College, Cambridge.

0035 Radio Netherlands: Happy Station. See S 0135.  
 0040 China Radio Int'l: Listeners' Letterbox. See S 1240.

## Tuesdays

0005 Radio Netherlands: CDutch. See M 1305.  
 0006 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0015 China Radio Int'l: The Business Show or China's Open Windows. See M 1215.  
 0030 BBC: Panel Game. This month, Nigel Rees hosts a quiz on quotations in "Quote, Unquote."  
 0035 Radio Netherlands: Newsline. See S 0035.  
 0040 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 0050 Radio Netherlands: Research File. See M 1150.

## Wednesdays

0006 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0015 China Radio Int'l: Current Affairs. See T 1215.  
 0030 BBC: Omnibus. Topical features on almost any topic, from Dracula to drugs (RR).  
 0035 Radio Netherlands: Newsline. See S 0035.  
 0040 China Radio Int'l: Listeners' Letterbox. See S 1240.  
 0050 Radio Netherlands: Mirror Images. See T 1150.

## Thursdays

0006 Christian Science Monitor: News Features And Interviews. See M 0006.

0015 China Radio Int'l: Current Affairs. See T 1215.

0030 BBC: Comedy/Quiz. See W 1530.

0035 Radio Netherlands: Newsline. See S 0035.

0040 China Radio Int'l: Learn To Speak Chinese. See M 1240.

0050 Radio Netherlands: Feature Documentary. See W 1150.

## Fridays

0006 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0015 China Radio Int'l: Current Affairs. See T 1215.  
 0030 BBC: Music Feature. This month, hear interviews with India's top musicians in "Eastern Sounds."  
 0035 Radio Netherlands: Newsline. See S 0035.  
 0040 China Radio Int'l: Culture In China. See H 1240.  
 0050 Radio Netherlands: Media Network. See H 0150.

## Saturdays

0005 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0015 China Radio Int'l: Current Affairs. See T 1215.  
 0030 BBC: From The Weeklies. Extracts from the best of the week's newspapers and magazines.  
 0035 Radio Netherlands: Newsline. See S 0035.  
 0040 China Radio Int'l: In The Third World. See F 1240.  
 0045 BBC: Recording Of The Week. See M 0615.  
 0050 Radio Netherlands: Toward 2000. See F 1150.

0100 UTC

[8:00 PM EST/5:00 PM PST]

## FREQUENCIES

0100-0200 twhf	Argentina, RAE Buenos Aires	11710am
0100-0200	Australia, ABC Brisbane	4920do 9660do
0100-0200	Australia, ABC Perth	9610do
0100-0200	Australia, Radio	13605pa 15240pa 15320va 15365pa
		17630as 17715pa 17750as 17795pa
		17880as 21590as 21740pa 21775as
0100-0200	Bulgaria, Radio Sofia	7225na 9700na 11720na
0100-0200	Canada, CFCX Montreal	6005do
0100-0200	Canada, CFRX Toronto	6070do
0100-0200	Canada, CFVP Calgary	6030do
0100-0200	Canada, CHNX Halifax	6130do
0100-0200	Canada, CKZU Vancouver	6160do
0100-0159 sm	Canada, RCI Montreal	9535am 9755am 11845am 11940am
		13720am
0100-0130 twhfa	Canada, RCI Montreal	5960am 9755am
0100-0200	Costa Rica, RFPI Santa Ana	7375am 7385na 13630am 15030am
0100-0200	Cuba, Radio Havana Cuba	6010na 9815na
0100-0127	Czechoslovakia, Radio	5930na 7345na 9580na
0100-0200	Ecuador, HCJB Quito	9745am 15155am 21455am
0100-0150	Germany, Deutsche Welle	6040na 6055na 6085na 6120na
		6145na 9515na 9565na 9610na
		9770na 11865na
0100-0130	Iran, VOIRI Tehran	9022am 11790am 15260am
0100-0120	Italy, RAI Rome	9575am 11800am
0100-0200	Japan, Radio	11840me 15195as 17810as 17835as
		17845as
0100-0200	Namibia, Namibia BC Corp	3290af
0100-0125	Netherlands, Radio	6020na 6165na 9860as 11655as
		11835na
0100-0200	New Zealand, R NZ Intl	17770pa
0100-0130 sm	Norway, Radio Norway Intl	9565am
0100-0200	Philippines, FEBC Manila	15450as
0100-0200	Russia, Radio Moscow	6000va 6045va 7115na 7150va
		7295va 9725va 9750va 9870va
		11655va 12015va 12050na 15425na
		17655va 17890va 21530va 21770va
0100-0200 vl	S Africa, Radio Orion	21790va
		4810af

0100-0200	Singapore, SBC1	5010do	5052do	11940do
0100-0130	South Korea, Radio Korea	9770na	11865na	15575am
0100-0200	Spain, Spanish Natl Radio	9530na		
0100-0200	Sri Lanka, SLBC Colombo	6005as	9720as	15425as
0100-0130	Sweden, Radio	9695as	11820as	
0100-0200	Thailand, Radio	9655as	11905as	
0100-0200	Ukraine, R Ukraine Intl	6080eu	7180eu	7195eu
		9640eu	9710eu	9860eu
		17605na	17690na	
0100-0130	United Kingdom, BBC London	5965as	5975na	6005sa
		7135as	7325na	9580as
		9915na	11750sa	11955as
		15260sa	15280as	15360pa
0100-0200	USA, CSMonitor Boston MA	5850na	9850af	13760na
0100-0200 sa	USA, CSMonitor Boston MA	17865as		
0100-0200	USA, KCBI Dallas TX	15725am		
0100-0200	USA, KTBN Salt Lk City UT	7510na		
0100-0200	USA, KVOH Los Angeles CA	17775am		
0100-0200	USA, VOA Washington DC	5995am	6130am	7205as
		9455am	9740as	9775am
		11705am	15120am	15205am
		17740as	21550as	
0100-0200	USA, WHRI Noblesville IN	7315am		
0100-0200	USA, WINB Red Lion PA	15145na		
0100-0200	USA, WJCR Upton KY	7490na	13595na	
0100-0200	USA, WRNO New Orleans LA	7355na		
0100-0200	USA, WWCR Nashville TN	5935na	7435na	
0100-0200	USA, WYFR Okeechobee FL	5985am	9505am	15440am
0100-0130	Uzbekistan, R Tashkent	5995as	7325as	7335as
		9755as	11975as	
0100-0130	Yugoslavia, Radio	9580am		
0130-0200	Albania, R Tirana Intl	9580na	11840na	
0130-0200	Austria, R Austria Intl	9870sa	9875na	13730na
0130-0150 mtwhfa	Greece, Voice of	9395na	9420na	11645na
0130-0200	Netherlands, Radio	9860as	11655as	
0130-0200	United Kingdom, BBC London	5965as	5975na	6005na
		9580na	9915na	11955va
		15360va	17790va	15280va
0145-0200	Vatican State, Vatican R	9650as	11935as	

## SELECTED PROGRAMS

## Sundays

0101 BBC: Play Of The Week. This month: "In The Native State" (7th); "The Hole In The Top Of The World" (14th); "A Wing And A Prayer" (21st); "The Pipsqueak" (28th).  
 0105 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0135 Radio Netherlands: Happy Station. Pete Myers' family entertainment program with music and letters.

## Mondays

0101 BBC: Feature/Drama. This month's pix: "What's News" and "After Independence" (1st); "In Their Element — Fire" (8th); "It's All A Plot" (15th); "Marking Time" (22nd); "Images Of Debussy" (29th).  
 0106 Christian Science Monitor (as): Encore. Re-runs of the best programs from the week just past.  
 0134 Christian Science Monitor (as): Letterbox. Staff members respond to listener letters.  
 0135 Radio Netherlands: East Of Edam. See S 0235.  
 0145 BBC: Musical Feature. Recordings of great singers from the past are the fare on "Mastersingers" (through April 5th).  
 0147 Christian Science Monitor (as): Religious Article. A reading from The Christian Science Monitor.

## Tuesdays

0105 BBC: Outlook. See M 1405.  
 0106 Christian Science Monitor: Home Forum. See M 2306.  
 0130 BBC: Folk Routes. Ian Anderson presents a selection of roots music.

0134 Christian Science Monitor: Letterbox. See M 0134.

0135 Radio Netherlands: Newsline. See S 0035.

0145 BBC: Health Matters. New medical developments and methods of keeping fit.

0147 Christian Science Monitor: Religious Article. See M 0147.

0150 Radio Netherlands: No Boundaries. Carl Joseph looks at development issues worldwide.

0145 BBC: The Farming World. An examination of issues that affect food production worldwide.

0147 Christian Science Monitor: Religious Article. See M 0147.

0150 Radio Netherlands: Media Network. Jonathan Marks surveys communications developments worldwide.

## Fridays

0105 BBC: Outlook. See M 1405.  
 0106 Christian Science Monitor: Arts Forum or Sportsworld. See H 2306.  
 0130 BBC: Seven Seas. Malcolm Billings presents news about ships and the sea.  
 0134 Christian Science Monitor: Letterbox. See M 0134.  
 0135 Radio Netherlands: Newsline. See S 0035.  
 0145 BBC: Global Concerns. An update on environmental issues.  
 0147 Christian Science Monitor: Religious Article. See M 0147.  
 0150 Radio Netherlands: Research File. See M 1150.

## Saturdays

0105 BBC: Outlook. See M 1405.  
 0105 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0130 BBC: Short Story (except 6th: Seeing Stars). See S 0430.  
 0135 Radio Netherlands: Newsline. See S 0035.  
 0145 BBC: Jazz Now And Then. George Reid presents a mix of new releases and old tracks.  
 0150 Radio Netherlands: Feature Documentary. See W 1150.

## Thursdays

0105 BBC: Outlook. See M 1405.  
 0106 Christian Science Monitor: Kaleidoscope. See W 2306.  
 0130 BBC: Waveguide. See W 0415.  
 0134 Christian Science Monitor: Letterbox. See M 0134.  
 0135 Radio Netherlands: Newsline. See S 0035.  
 0140 BBC: Book Choice. See W 0425.

0200 UTC

[9:00 PM EST/6:00 PM PST]

## FREQUENCIES

0200-0300	Australia, ABC Brisbane	4920do	9660do		0200-0300	Thailand, Radio	9655as	11905as	
0200-0300	Australia, ABC Perth	6070do	9610do		0200-0230	United Kingdom, BBC London	5975na	6005sa	6175na 6195eu
0200-0300	Australia, Radio	15240pa	15320va	15365pa			7135as	7325na	9410eu 9580as
		17715pa	17750pa	17795pa			9590na	9670me	9915na 11750sa
		21252as	21590as	21740pa			11955as	12095va	15260sa 15280as
0200-0300	Canada, CFCX Montreal	6005do					15360pa	15380as	17790as 21715as
0200-0300	Canada, CFRX Toronto	6070do			0200-0300	USA, CSMonitor Boston MA	5850na	9350af	13760sa
0200-0300	Canada, CFVP Calgary	6030do			0200-0300 sa	USA, CSMonitor Boston MA	17555as	17865as	
0200-0300	Canada, CHNX Halifax	6130do			0200-0230	USA, KCBI Dallas TX	15725va		
0200-0300	Canada, CKZU Vancouver	6160do			0200-0300	USA, KTBN Salt Lk City UT	7510am		
0200-0259 twhfa	Canada, RCI Montreal	9535sa	9755sa	11845sa	0200-0300	USA, KVOH Los Angeles CA	17775am		
		13720sa			0200-0230 twhfa	USA, VOA Washington DC	5995am	7405am	9775am 11580am
0200-0300	Canada, RCI Montreal	9535am	9650am	11845am	11940am		15120am	15205am	
		13720am			0200-0300	USA, VOA Washington DC	7205as	9740as	11705as 15120am
0200-0300	Costa Rica, RFPI Santa Ana	7375na	7385na	13630na			15205am	15250as	17735as 17740as
0200-0300	Cuba, Radio Havana Cuba	5965na	6010na	9655na	0200-0300	USA, WHRI Noblesville IN	7315na		
0200-0300	Ecuador, HCJB Quito	9745am	15155am	21455am	0200-0300	USA, WINB Red Lion PA	15145eu		
0200-0300	Egypt, Radio Cairo	9475na	11865na		0200-0300	USA, WJCR Upton KY	7490na	13595na	
0200-0250	Germany, Deutsche Welle	6035as	7285as	9615as	0200-0300 vi	USA, WRNO New Orleans LA	7355am		
		9815as	11945as	12065as	0200-0300	USA, WWCR Nashville TN	5935va	7435am	
0200-0300 as	Guam, KSDA	13720as			0200-0300	USA, WYFR Okeechobee FL	5985am	6065am	9505am 15440am
0200-0230 mtwhfa	Kenya, Voice of	4935do			0200-0300	Yugoslavia, Radio	9580na	11870na	
0200-0300 smtwh	Malaysia, RTM Radio 4	7295do			0200-0230	Honduras, La Voz Mosquita	4911do		
0200-0300	Namibia, Namibia BC Corp	3290af			0205-0238	Iraq, Radio Iraq Intl	11860am		
0200-0225	Netherlands, Radio	9860as	11655as		0215-0300	Albania, R Tirana Intl	9580na	11840na	
0200-0300	New Zealand, R NZ Intl	17770pa			0230-0300	Kenya, Voice of	4935do		
0200-0230 sm	Norway, Radio Norway Intl	9565na			0230-0300 s	Netherlands, Radio	9860as	11655as	
0200-0230	Philippines, FEBC Manila	15450as			0230-0245	Pakistan, Radio	9515as	17705as	21485as
0200-0300	Romania, R Romania Intl	5990am	6155am	9510am	0230-0300	Philippines, FEBC Manila	17760as	17840as	21580as
		11830am	11940am		0230-0300 twhfa	Portugal, Radio	9570am	9600am	9705am 11840am
0200-0300	Russia, Radio Moscow	7115na	7150va	9775va	0230-0300	Sri Lanka, SLBC Colombo	9720as	15425as	
		9870va	9890va	11775va	0230-0300	United Kingdom, BBC London	5975na	6005sa	6175na 6195eu
		12050va	15425va	17655va	0230-0300		7135me	7325na	9670me 9915na
		21790va			0230-0300		11750sa	11955me	12095va 15260sa
0200-0300	S Africa, Channel Africa	11745af			0245-0310 smtwhf	Finland, Radio	9560na	11755na	
0200-0300 vl	S Africa, Radio Orion	4810do			0245-0300	India, All India Radio	3945as	7110as	11830as 15120as
0200-0300	Singapore, SBC1	5010do	5052do	11940do			15220as		
0200-0230	Sri Lanka, SLBC Colombo	6005as	9720as	15425as	0250-0300	Vatican State, Vatican R	7305na	9605na	
0200-0230	Sweden, Radio	9695na	11705na		0255-0300	Neth Antilles, TWR Bonaire	11930am		
0200-0230	Switzerland, Swiss R Intl	6135am	9650am	9885am					
0200-0300	Taiwan, VO Free China	5950na	9680na	9765pa					
		11860as	15345as	11740ca					

## SELECTED PROGRAMS

## Sundays

0205 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0230 BBC: Feature. Religion in South Asia is the fare on "Gods, Guides, And Gurus" (7th, 14th, 21st); visit communities of "Indians Abroad" (through April 25th).  
 0235 Radio Netherlands: East Of Edam. Dutch and international stories, music, and arts features.

## Mondays

0205 Christian Science Monitor (am): The Sunday Service. See S 1605.  
 0206 Christian Science Monitor (af): News Features And Interviews. See M 0006.  
 0230 BBC: Composer Of The Month. Profiles of famous classical-music composers. This month: that Beethoven guy.  
 0235 Radio Netherlands: Happy Station. See S 0135.

## Tuesdays

0206 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0230 BBC: Quiz. See M 1215.  
 0235 Radio Netherlands: Newsline. See S 0035.  
 0250 Radio Netherlands: Research File. See M 1150.

## Wednesdays

0206 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0230 BBC: Development '93. Aid and development issues for developing nations.  
 0235 Radio Netherlands: Newsline. See S 0035.  
 0250 Radio Netherlands: Mirror Images. See T 1150.

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## Thursdays

0206 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0230 BBC: Sports International. Live play-by-play, interviews, features, and discussions from the sports world.  
 0235 Radio Netherlands: Newsline. See S 0035.  
 0250 Radio Netherlands: Feature Documentary. See W 1150.

## Fridays

0206 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0230 BBC: Drama. See H 1130.  
 0235 Radio Netherlands: Newsline. See S 0035.  
 0250 Radio Netherlands: Media Network. See H 0150.

## Saturdays

0205 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0230 BBC: People And Politics. Background to the British political scene.  
 0235 Radio Netherlands: Newsline. See S 0035.  
 0250 Radio Netherlands: Toward 2000. See F 1150.

0300 UTC

[10:00 PM EST/7:00 PM PST]

## FREQUENCIES

0300-0400	Australia, ABC Brisbane	4920do	9660do		0300-0400	Singapore, SBC1	5010do	5052do	11940do	
0300-0400	Australia, ABC Perth	9610do			0300-0400	Sri Lanka, SLBC Colombo	9720as	15425as		
0300-0400	Australia, Radio	15240pa	15320va	15365pa	17630as	Taiwan, VO Free China	5950na	9680na	9765as	11745as
		17670as	17715pa	17750as	17795pa		15345na			
		17880as	21525as	21590as	21740pa					
		21775as								
0300-0400	Canada, CFCX Montreal	6005do			0300-0400	Tanzania, Radio	5985af	9685af	11765af	
0300-0400	Canada, CFRX Toronto	6070do			0300-0400	Thailand, Radio	9655as	11905as		
0300-0400	Canada, CFVP Calgary	6030do			0300-0330	United Kingdom, BBC London	5975na	6005va	6175na	6180eu
0300-0400	Canada, CHNX Halifax	6130do					7325na	9410eu	9600af	9915na
0300-0400	Canada, CKZU Vancouver	6160do					11730af	11750va	11760me	15260sa
0300-0400	China, China Radio Intl'	9690na	9770na	11715na	0300-0400	USA, CSMonitor Boston MA	5850na	9350af	13760sa	
0300-0400	Costa Rica, TIFC San Jose	5055ca			0300-0400 sa	USA, CSMonitor Boston MA	17555as	17865as		
0300-0400	Costa Rica, RFPI Santa Ana	7375na	7385na	13630na	0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	Cuba, Radio Havana Cuba	6010na	9655na		0300-0330	USA, KVOH Los Angeles CA	9785sa			
0300-0330	Czechoslovakia, Radio	5930na	7345na	9810na		USA, VOA Washington DC	5965eu	11905me	15160me	17810eu
0300-0400	Ecuador, HCJB Quito	9745am	15155am	21455am	0300-0400	USA, VOA Washington DC	6035af	7265af	7280af	7405af
0300-0330	Egypt, Radio Cairo	9475na	11865na				9575af	9885af	11835af	11850af
0300-0310 smtwhf	Finland, Radio	9560na	11755na				11890af	15115af		
0300-0350	Germany, Deutsche Welle	6045na	6055na	6085na	0300-0400	USA, WHRI Noblesville IN	7315na			
		9535na	9545na	9640na	0300-0400	USA, WJCR Upton KY	7490na	13595na		
		9770na			0300-0400 vl	USA, WRNO New Orleans LA	7395am			
0300-0400	Guatemala, Radio Cultural	3300do			0300-0400	USA, WWCR Nashville TN	5935na	7435na		
0300-0400 sm	Honduras, R Luz y Vida	3250ca			0300-0400	USA, WYFR Okeechobee FL	5985am	6065am	9505am	
0300-0400	Hungary, Radio Budapest	6110na	9835na	11910na	0300-0315	Vatican State, Vatican R	7305na	9605na		
0300-0400	Iraq, Radio Iraq Intl'	11860am			0300-0400	Albania, R Tirana Intl	9580na	11825na		
0300-0330	Japan, Radio	5960am	15230va	15325am	0300-0400	Austria, R Austria Intl	9870ca	13730na		
		17825am	21610am		0300-0355 vl	India, All India Radio	7110as	15120as	15220as	
0300-0400	Kenya, Voice of	4935do			0300-0400	Japan, Radio	5960na	11870na	17810as	
0300-0400 smtwh	Malaysia, RTM Radio 4	7295do			0300-0400	Netherlands, Radio	9590na	11720na		
0300-0400	Nett Antilles, TWR Bonaire	9535am	11930am		0330-0400	UAE, UAE Radio Dubai	11795na	13695eu	15320eu	15435na
0300-0325	Netherlands, Radio	9860as	11655as		0330-0400	United Kingdom, BBC London	3255af	5975na	6005af	6175va
0300-0400	New Zealand, R NZ Intl'	17770pa					6180eu	6190af	6195eu	9410eu
0300-0330	Philippines, FEBC Manila	17760as	17840as	21580as			9600af	9915af	11740af	11760me
0300-0400	Russia, Radio Moscow	7115na	7150na	9480na	0330-0400 irreg	USA, WEWN Birmingham AL	7540na			
		9715na	9775va	9830va	0340-0350 mtwhfa	Greece, Voice of	9395na	9420na	11645na	
		12015va	12050va	15425va	0345-0359 varies	Armenia, Radio Yerevan	11675na	11790na	13645am	15580na
0300-0400	S Africa, Channel Africa	7270af	11745af							
0300-0400	S Africa, Radio Oranje	3230do								

## SELECTED PROGRAMS

## Sundays

0305 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0315 BBC: Sports Roundup. News from the world of sports.  
 0315 China Radio Intl': Press Clippings. See S 0015.  
 0320 China Radio Intl': Travel Talk. See S 0020.  
 0328 China Radio Intl': Cooking Show. See S 0028.  
 0330 BBC: From Our Own Correspondent. Reporters comment on the background to the news.  
 0335 China Radio Intl': Music From China. See S 0035.  
 0335 Radio Netherlands: Newsline. See S 0035.  
 0350 BBC: Write On... Paddy Feeny presents listener letters, opinions, and questions.  
 0350 Radio Netherlands: Sounds Interesting. See S 0050.

## Mondays

0306 Christian Science Monitor (af): Encore. See M 0106.  
 0315 BBC: Sports Roundup. See S 0315.  
 0315 China Radio Intl': Sports Beat. See S 1215.  
 0320 China Radio Intl': China Anthology. See S 1220.  
 0328 China Radio Intl': Music Album. See S 1228.  
 0330 BBC: Anything Goes. See S 1430.  
 0334 Christian Science Monitor (af): Letterbox. See M 0134.  
 0335 Radio Netherlands: Happy Station. See S 0135.  
 0340 China Radio Intl': Listeners' Letterbox. See S 1240.  
 0347 Christian Science Monitor (af): Religious Article. See M 0147.

## Tuesdays

0306 Christian Science Monitor: Home Forum. See M 2306.

0315 BBC: Sports Roundup. See S 0315.  
 0315 China Radio Intl': The Business Show or China's Open Windows. See M 1215.  
 0330 BBC: John Peel. Newly released albums and singles from the contemporary music scene.

0334 Christian Science Monitor: Letterbox. See M 0134.  
 0335 Radio Netherlands: Newsline. See S 0035.  
 0340 China Radio Intl': Learn To Speak Chinese. See M 1240.  
 0347 Christian Science Monitor: Religious Article. See M 0147.  
 0350 Radio Netherlands: Research File. See M 1150.

## Wednesdays

0306 Christian Science Monitor: Curtain Call. See T 2306.  
 0315 BBC: Sports Roundup. See S 0315.  
 0315 China Radio Intl': Current Affairs. See T 1215.  
 0330 BBC: Discovery. An in-depth look at scientific research.  
 0334 Christian Science Monitor: Letterbox. See M 0134.  
 0335 Radio Netherlands: Newsline. See S 0035.  
 0340 China Radio Intl': Listeners' Letterbox. See S 1240.  
 0347 Christian Science Monitor: Religious Article. See M 0147.  
 0350 Radio Netherlands: Mirror Images. See T 1150.

## Thursdays

0306 Christian Science Monitor: Kaleidoscope. See W 2306.  
 0315 BBC: Sports Roundup. See 0315.  
 0315 China Radio Intl': Current Affairs. See T 1215.  
 0330 BBC: Assignment. A weekly examination of topical issues, from Batman to bandits.  
 0334 Christian Science Monitor: Letterbox. See M 0134.

0335 Radio Netherlands: Newsline. See S 0035.

0340 China Radio Intl': Learn To Speak Chinese. See M 1240.  
 0347 Christian Science Monitor: Religious Article. See M 0147.

0350 Radio Netherlands: Feature Documentary. See W 1150.

## Fridays

0306 Christian Science Monitor: Arts Forum or Sportsworld. See H 2306.  
 0315 BBC: Sports Roundup. See S 0315.  
 0315 China Radio Intl': Current Affairs. See T 1215.  
 0330 BBC: Focus On Faith. Comment and discussion on major issues in the worlds of religion.  
 0334 Christian Science Monitor: Letterbox. See M 0134.  
 0335 Radio Netherlands: Newsline. See S 0035.  
 0340 China Radio Intl': Culture In China. See H 1240.  
 0347 Christian Science Monitor: Religious Article. See M 0147.  
 0350 Radio Netherlands: Media Network. See H 0150.

## Saturdays

0305 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0315 BBC: Sports Roundup. See S 0315.  
 0315 China Radio Intl': Current Affairs. See T 1215.  
 0330 BBC: The Vintage Chart Show. Paul Burnett with classic Top 20 hits.  
 0335 Radio Netherlands: Newsline. See S 0035.  
 0340 China Radio Intl': In The Third World. See F 1240.  
 0350 Radio Netherlands: Toward 2000. See F 1150.

0400 UTC

[11:00 PM EST/8:00 PM PST]

## FREQUENCIES

0400-0500	Australia, ABC Brisbane	4920do	9660do		0400-0500	vl	S Africa, Radio Oranje	3230do	
0400-0500	Australia, ABC Perth	9610do			0400-0500	Singapore, SBC1	5010do	5052do	11940do
0400-0500	Australia, Radio	15240pa	15365pa	17630as	17715pa	0400-0430	Sri Lanka, SLBC Colombo	9720as	15425as
		17750as	17795pa	17880as	21525as	0400-0430	Switzerland, Swiss R Intl	6135na	9860na
		21740pa	21775as			0400-0430	Tanzania, Radio	5985af	9685af
0400-0500	Bulgaria, Radio Sofia	7290eu	9700na	11720na		0400-0430	Thailand, Radio	9655as	11905as
0400-0500	Canada, CFCX Montreal	6005do				0400-0500	Turkey, Voice of	9445na	
0400-0500	Canada, CFRX Toronto	6070do				0400-0430	United Kingdom, BBC London	3255va	5975na
0400-0500	Canada, CFVP Calgary	6030do						6005af	6175am
0400-0500	Canada, CHNX Halifax	6130do						6180eu	6195eu
0400-0500	Canada, CKZU Vancouver	6160do						7325na	9410eu
0400-0430	Canada, RCI Montreal	9505me	9650eu	9670me				9750eu	11750va
0400-0500	China, China Radio Intl	11680na			0400-0500	USA, CSMonitor Boston MA	5850na	9840af	11955me
0400-0500	Costa Rica, RFPI Santa Ana	7375na	7385na	13630na	15030om			15070va	15280as
0400-0430 varies	Croatian Radio via WHRI	7315na	9495na			0400-0500	USA, CSMonitor Boston MA	17780as	15310va
0400-0430	Cuba, Radio Havana Cuba	5965na	6010na	6180am	9655na	0400-0500	USA, KTBN Salt Lk City UT	17555as	15575va
		9815na				0400-0500	USA, KVOH Los Angeles CA	9785am	15590eu
0400-0427	Czechoslovakia, Radio	5930na	7345na	9810na	11985va	0400-0500	USA, VOA Washington DC	5995me	6040me
		13715va				0400-0500		6155me	6140me
0400-0430	Ecuador, HCJB Quito	9745am	15155am	21455am		0400-0430	USA, VOA Washington DC	7265af	7405me
0400-0450	Germany, Deutsche Welle	6065af	6130af	7150af	7225af	0400-0500		7280af	9575af
		7275af	9665am	9765af	11765af	0400-0500	USA, WHRI Noblesville IN	9815am	11850af
		13770af				0400-0500		11835af	15115af
0400-0430	Guatemala, Radio Cultural	3300do				0400-0500	USA, WJCR Upton KY	7490na	13595na
0400-0500	Iraq, Radio Iraq Intl	11860am				0400-0500	USA, WMLR Bethel PA	9465eu	
0400-0500	Kenya, Voice of	4935do				0400-0500	USA, WRNO New Orleans LA		7395am
0400-0500 smtwh	Malaysia, RTM Radio 4	7295do				0400-0500	USA, WWCR Nashville TN	5935va	7435na
0400-0500 mtwhf	Namibia, Namibia BC Corp	3270af	3290af			0400-0500	USA, WYFR Okeechobee FL	5985am	9505am
0400-0430	Neth Antilles, TWR Bonaire	9535am	11930am			0425-0440	Italy, RAI Rome	5990eu	7275me
0400-0425	Netherlands, Radio	9590na	11720na			0430-0500	Cuba, Radio Havana Cuba	6010na	9815na
0400-0500	New Zealand, R NZ Intl	15120pa				0430-0500	Nigeria, Radio	3326do	4770do
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as		0430-0500	Russia, AWR Russia	15125eu	
0400-0430 sm	Norway, Radio Norway Intl	9560na	9650na			0430-0500	Swaziland, TWR	5055af	9655af
0400-0430	Romania, R Romania Intl	5990na	6155na	9510na	9570na	0430-0500		5965af	7215af
		11830na	11940na					11750af	9600af
0400-0500	Russia, Radio Moscow	7150va	7270va	7295va	9665va			6195eu	6180eu
		9735va	9870va	11675va	11895va			7325na	9770va
		12055va	15425na	17765va	17870va	0445-0500	United Kingdom, BBC London	5975na	15400af
		17890va				0445-0500		6005af	6175eu
0400-0500	S Africa, Channel Africa	7270af	15345af					6195eu	6180eu
								12095va	15280as
								15575va	15310va
								17885va	21470as
								9720na	15425na
								7255af	

## SELECTED PROGRAMS

## Sundays

0405 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0415 BBC: Feature. "Inside The Photograph Album" looks at other people's photo albums (7th); Sandy Walsh profiles "India's Children Of Courage" (14th, 21st, 28th).  
 0415 China Radio Int'l: Press Clippings. See S 0015.  
 0420 China Radio Int'l: Travel Talk. See S 0020.  
 0428 China Radio Int'l: Cooking Show. See S 0028.  
 0430 BBC: Short Story. This month, stories by listeners in South Asia: "Jhok" (14th); "Fisherman's Luck" (21st); "It Is Essential That She Has A Child" (28th) (except 7th: Seeing Stars, a monthly look at astronomy).  
 0435 China Radio Int'l: Music From China. See S 0035.  
 0445 BBC: Musical Feature. This month, Robbie Vincent presents the best of soul music in "A Taste Of Soul."

## Mondays

0405 Christian Science Monitor (am): The Sunday Service. See S 1605.  
 0406 Christian Science Monitor (af,as): News Features And Interviews. See M 0006.  
 0415 BBC: Talks. This month, Chris Westcott examines that most complex of organs, "The Brain."  
 0415 China Radio Int'l: Sports Beat. See S 1215.  
 0420 China Radio Int'l: China Anthology. See S 1220.  
 0428 China Radio Int'l: Music Album. See S 1228.

0430 BBC: Off The Shelf. This month's South Asian selections: Malayatoor Ramakrishnan's "Yakshi" (1st-9th) and Shrilal Skukla's "Raag Darbari" (through April 2nd).  
 0440 China Radio Int'l: Listeners' Letterbox. See S 1240.  
 0445 BBC: Andy Kershaw's World Of Music. New and unusual sounds from the world over.

## Tuesdays

0406 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0415 BBC: Health Matters. See T 0145.  
 0415 China Radio Int'l: The Business Show or China's Open Windows. See M 1215.  
 0430 BBC: Off The Shelf. See M 0430.  
 0440 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 0445 BBC: Talks. See M 2315.

## Wednesdays

0406 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0415 BBC: Waveguide. Tips on how to hear the BBC better.  
 0415 China Radio Int'l: Current Affairs. See T 1215.  
 0425 BBC: Book Choice. A short review of a recently released book.  
 0430 BBC: Off The Shelf. See M 0430.  
 0440 China Radio Int'l: Listeners' Letterbox. See S 1240.  
 0445 BBC: Country Style. See W 0145.

## Thursdays

0406 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0415 BBC: The Farming World. See H 0145.  
 0415 China Radio Int'l: Current Affairs. See T 1215.  
 0430 BBC: Off The Shelf. See M 0430.  
 0440 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 0445 BBC: From Our Own Correspondent. See S 0330.

## Fridays

0406 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0415 BBC: Musical Feature. See M 0145.  
 0415 China Radio Int'l: Current Affairs. See T 1215.  
 0430 BBC: Off The Shelf. See M 0430.  
 0440 China Radio Int'l: Culture In China. See H 1240.  
 0445 BBC: Folk Routes. See T 0130.

## Saturdays

0405 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0415 BBC: Good Books. See W 1445.  
 0415 China Radio Int'l: Current Affairs. See T 1215.  
 0430 BBC: Jazz Now And Then. See A 0145.  
 0440 China Radio Int'l: In The Third World. See F 1240.  
 0445 BBC: Worldbrief. See F 2315.

0500 UTC

[12:00 AM EST/9:00 PM PST]

## FREQUENCIES

0500-0600	Australia, ABC Brisbane	4920do	9660do		
0500-0600	Australia, ABC Perth	9610do			
0500-0600	Australia, Radio	15240pa	15320pa	15365pa	17630as
		17715pa	17750as	17795pa	17880as
		21525as	21740pa	21775as	
0500-0600	Canada, CFCX Montreal	6005do			
0500-0600	Canada, CFRX Toronto	6070do			
0500-0600	Canada, CFVP Calgary	6030do			
0500-0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0600	China, China Radio Intl	11840am			
0500-0600	Costa Rica, RFPI Santa Ana	7375na	7385na	13630na	15030na
0500-0600	Cuba, Radio Havana Cuba	9510na			
0500-0600	Ecuador, HCJB Quito	9745am	11925am	21455am	
0500-0600 sa	Eq Guinea, R East Africa	9585af			
0500-0550	Germany, Deutsche Welle	5960na	6045na	6120na	6130na
		9535na	9670na	9690na	
0500-0515	Iraq, Radio Iraq Intl	11860am			
0500-0515	Israel, Kol Israel	9435na			
0500-0600 irreg	Italy, IRRS Milan	7125eu			
0500-0600	Japan, Radio	6085me	7230eu	15230na	17765na
		17810na	17825na	17860as	21610na
0500-0600	Kenya, Voice of	4935do			
0500-0600	Malaysia, RTM Radio 4	7295do			
0500-0600 mtwhf	Namibia, Namibia BC Corp	3270af	3290af		
0500-0600	New Zealand, R NZ Intl	15120pa			
0500-0600	Nigeria, Radio	3326do	4770do	4990do	
0500-0600	Nigeria, Voice of	7255af			
0500-0600	Russia, Radio Moscow	5950eu	6165eu	7150na	7165na
		7170va	7180na	7255af	7270va
		7390eu	9870na	9890eu	12050va
		15455va	17570va	17890va	
0500-0600	S Africa, Channel Africa	15430af			
0500-0600	Singapore, SBC1	5052do	11940do		
0500-0600	Spain, Spanish Natl Radio	9530na			
0500-0515 t	Sri Lanka, SLBC Colombo	9720na	15425na		
0500-0530	Swaziland, TWR	9655af			
0500-0600	Thailand, Radio	9655as	11905as		

0500-0530	United Kingdom, BBC London	5975na	6005af	6180eu	6195eu
		9410eu	9600af	9640na	9750va
		12095va	15280as	15310va	15400af
		15575as	17830va	17885va	
0500-0600	USA, CSMonitor Boston MA	5850na	9840af	9870na	13760na
		17780as			
0500-0600 sa	USA, CSMonitor Boston MA	17555as			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9785am	9815am		
0500-0600	USA, VOA Washington DC	5995me	6035af	6040me	6140me
		7170me	7405af	9530me	9575af
		9635me	9700me	9885af	11825me
		11850af	12080me	15115af	15205me
0500-0600	USA, WHRI Noblesville IN	7315na	9495na		
0500-0600	USA, WINB Red Lion PA	15145eu			
0500-0600	USA, WJCR Upton KY	7490na	13595na		
0500-0600 mtwhfa	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WRNO New Orleans LA	7395am			
0500-0600	USA, WWCR Nashville TN	5935na	7435na		
0500-0600	USA, WYFR Okeechobee FL	5985am	9880eu	11915eu	13695eu
0500-0530	Vatican State, Vatican R	11625af	15090af	17730af	
0510-0515	Botswana, Radio	7255af			
0510-0600 vl	S Africa, Radio Oranje	9630do			
0524-0600 f	Ghana, GBC Radio 2	3366do			
0525-0600	Ghana, GBC Radio 1	4915do			
0530-0600	Austria, R Austria Intl	6015na	6155eu	13730eu	15410eu
0530-0600	Romania, R Romania Intl	11840af	15380af	17720af	17745af
		17790af	21665af		
0530-0600	Russia, AWR Russia	15125as			
0530-0600	Swaziland, TWR	5965af	11750af		
0530-0600	UAE, UAE Radio Dubai	15435as	17830as	21700as	
0530-0600	United Kingdom, BBC London	5975na	6085va	6180as	6190af
		6195eu	9410eu	9640na	9740eu
		15310va	15360va	15400af	15400va
		17885va	21470eu		

## SELECTED PROGRAMS

## Sundays

0505 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0515 China Radio Int'l: Press Clippings. See S 0015.  
 0520 China Radio Int'l: Travel Talk. See S 0020.  
 0528 China Radio Int'l: Cooking Show. See S 0028.  
 0535 China Radio Int'l: Music From China. See S 0035.

## Mondays

0506 Christian Science Monitor (af,as): Encore. See M 0106.  
 0515 China Radio Int'l: Sports Beat. See S 1215.  
 0520 China Radio Int'l: China Anthology. See S 1220.  
 0528 China Radio Int'l: Music Album. See S 1228.  
 0534 Christian Science Monitor (af,as): Letterbox. See M 0134.  
 0540 China Radio Int'l: Listeners' Letterbox. See S 1240.  
 0547 Christian Science Monitor (af,as): Religious Article. See M 0147.

## Tuesdays

0506 Christian Science Monitor: Home Forum. See M 2306.  
 0515 China Radio Int'l: The Business Show or China's Open Windows. See M 1215.  
 0534 Christian Science Monitor: Letterbox. See M 0134.  
 0540 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 0547 Christian Science Monitor: Religious Article. See M 0147.

## Wednesdays

0506 Christian Science Monitor: Curtain Call. See T 2306.  
 0515 China Radio Int'l: Current Affairs. See T 1215.  
 0534 Christian Science Monitor: Letterbox. See M 0134.  
 0540 China Radio Int'l: Listeners' Letterbox. See S 1240.

0547 Christian Science Monitor: Religious Article. See M 0147.

## Thursdays

0506 Christian Science Monitor: Kaleidoscope. See W 2306.  
 0515 China Radio Int'l: Current Affairs. See T 1215.  
 0534 Christian Science Monitor: Letterbox. See M 0134.  
 0540 China Radio Int'l: Learn To Speak Chinese. See M 1240.

0547 Christian Science Monitor: Religious Article. See M 0147.

## Fridays

0506 Christian Science Monitor: Arts Forum or Sportsworld. See H 2306.

0515 China Radio Int'l: Current Affairs. See T 1215.

0534 Christian Science Monitor: Letterbox. See M 0134.

0540 China Radio Int'l: Culture In China. See H 1240.

0547 Christian Science Monitor: Religious Article. See M 0147.

## Saturdays

0505 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0515 China Radio Int'l: Current Affairs. See T 1215.  
 0540 China Radio Int'l: In The Third World. See F 1240.

*China Radio International's Yang Zhanping, editor with the "Current Affairs" program of the English Service, along with her son.*



0600 UTC

[1:00 AM EST/10:00 PM PST]

## FREQUENCIES

0600-0700	Australia, Radio	6020pa	11670va	11720pa	11880pa	0600-0700	Swaziland, TWR	5965af	7200af	11740af
		15240pa	15320pa	15365pa	17715pa	0600-0630	Switzerland, Swiss R Intl	9860af	13635af	17565af
		21740pa				0600-0615	Switzerland, Swiss R Intl	3985eu	6165eu	9535eu
0600-0700	Canada, CFCX Montreal	6005do				0600-0700 sa	Thailand, Radio	9655as	11905as	
0600-0700	Canada, CFRX Toronto	6070do				0600-0630	United Kingdom, BBC London	5975na	6180eu	6195eu
0600-0700	Canada, CFVP Calgary	6030do						9410eu	9590na	9750eu
0600-0700	Canada, CHNX Halifax	6130do						15280va	15360as	15400va
0600-0700	Canada, CKZU Vancouver	6160do						17790sa	17830va	15420af
0600-0700	Costa Rica, RFPI Santa Ana	7375na	7385na	13630am	15030na	0600-0700	USA, CSMonitor Boston MA	5850na	7395eu	17555as
0600-0700	Cuba, Radio Havana Cuba	6000na	9510na			0600-0700	USA, KTBN Salt Lk City UT	7510na		17780as
0600-0700	Ecuador, HCJB Quito	11925am	15155am	21455am		0600-0700	USA, KVOH Los Angeles CA	9785na		
0600-0700 sa	Eq Guinea, R East Africa	9585af				0600-0700	USA, VOA Washington DC	3980eu	5995eu	6035af
0600-0650	Germany, Deutsche Welle	11765af	13610af	13790af	15185af			6060me	6873eu	7325me
		15435af	17875af					9530af	9575af	9885af
									11925af	15115af
0600-0700	Ghana, GBC Radio 1	4915do				0600-0700	USA, WHRI Noblesville IN	7315eu	9495am	15600af
0600-0700 f	Ghana, GBC Radio 2	3366do				0600-0700	USA, WJCR Upton KY	7490na	13595na	
0600-0700 irreg	Italy, IRRS Milan	7125eu				0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu		
0600-0625	Kenya, Voice of	4935do				0600-0700	USA, WWCR Nashville TN	5935na	7435na	
0600-0700	Kiribati, Radio	17440do				0600-0700	USA, WYFR Okeechobee FL	5985am	7355eu	11915af
0600-0630 s	Latvia, Radio Riga	5935eu				0600-0620	Vatican State, Vatican R	6245eu	7250eu	13695af
0600-0700	Lebanon, King of Hope	6280me				0603-0610 tent	Croatia, Croatian Radio	6210eu	9830eu	13830eu
0600-0640 last a	Lithuania, Radiocentras	9710eu				0615-0700 mtwhf	Canada, RCI Montreal	6150eu	7155eu	9740af
0600-0700 smtwha	Malaysia, RTM Radio 4	7295do						11935af		9760eu
0600-0700	Malaysia, Voice of	6175as	9750as	15295as		0625-0700	Kenya, Voice of	4935do		
0600-0700	Malta, V of Mediterranean	9765eu				0630-0700	Austria, R Austria Intl	6015na		
0600-0658	New Zealand, R NZ Intl	15120pa				0630-0700 smtwhf	New Zealand, ZLXA	3935do		
0600-0700 s	New Zealand, ZLXA	3935do				0630-0700	United Kingdom, BBC London	5975na	6180eu	6195eu
0600-0700	Nigeria, Radio	3326do	4770do	4990do				9410eu	9640va	9750eu
0600-0700	Nigeria, Voice of	7255af						11940af	11955as	12095eu
0600-0650	North Korea, R Pyongyang	15180as	15230as					15400af	17790as	17885va
0600-0645	Romania, R Romania Intl	7225eu	9510eu	9570eu	11775eu	0630-0700	Vatican State, Vatican R	11625af	15090af	17730af
0600-0700	Russia, Radio Moscow	5905va	7150eu	7165va	7170va	0635-0700	Monaco, TWR Monte Carlo	9480eu		
		7175va	7180eu	7270na	9860va	0645-0700	Ghana, GBC	6130af		
		9870va	9890eu	17570va		0645-0700	Romania, R Romania Intl	11810pa	11940pa	15335pa
0600-0700	S Africa, Channel Africa	15430af				0645-0700		17805pa	21665pa	17720pa
0600-0700 vl	S Africa, Radio Oranje	9630do				0655-0700	Neth Antilles, TWR Bonaire	11815am	15345am	
0600-0700	Singapore, SBC1	5010do	5052do	11940do						
0600-0700	South Korea, Radio Korea	7275na	11945na	15155na						

## SELECTED PROGRAMS

## Sundays

0605 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0615 BBC: Letter From America. Alistair Cooke shares his inimitable view of American life.  
 0630 BBC: Jazz For The Asking. Digby Fairweather plays listener requests.

## Mondays

0606 Christian Science Monitor: News Features And Interviews. See M 0006.

0615 BBC: Recording Of The Week. A personal choice of new classical music releases.  
 0630 BBC: Feature. See S 1401.

## Wednesdays

0606 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0615 BBC: The World Today. See M 1645.  
 0630 BBC: Meridian. Events in the world of the arts.

## Thursdays

0606 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0615 BBC: The World Today. See M 1645.  
 0630 BBC: Sports International. See H 0230.

## Fridays

0606 Christian Science Monitor: News Features And Interviews. See M 0006.  
 0615 BBC: The World Today. See M 1645.  
 0630 BBC: Meridian. See W 0630.

## Saturdays

0605 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 0615 BBC: The World Today. See M 1645.  
 0630 BBC: Meridian. See W 0630.

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0700 UTC [2:00 AM EST/11:00 PM PST]

0700-0730	Australia, Radio	6020pa 15320va 21740pa	11720va 15365pa 17695as	11880pa 17695as 17750as	15240pa
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica, RFPI Santa Ana	7375na	7385na	13630na	15030na
0700-0730	Czechoslovakia, Radio	6055eu	7345eu	9505eu	11990eu
0700-0800	Ecuador, HCJB Quito	6205eu	9745eu	11835eu	11925eu
		21455eu			
0700-0800	Ghana, GBC	6130af			
0700-0800	Ghana, GBC Radio 1	4915do			
0700-0800 f	Ghana, GBC Radio 2	3366do			
0700-0800 irreg	Italy, IRRS Milan	7125eu			
0700-0800	Japan, Radio	5970eu	6025eu	15405pa	17765eu
		17810as	17860as	21575as	
0700-0800	Kenya, Voice of	4935do			
0700-0800	Lebanon, King of Hope	6280me			
0700-0800 smtwha	Malaysia, RTM Radio 4	7295do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295as	
0700-0800	Monaco, TWR Monte Carlo	9480eu			
0700-0800	Neth Antilles, TWR Bonaire	11815am	15345am		
0700-0800	New Zealand, R NZ Intl	9700pa			
0700-0800 smtwhf	New Zealand, ZXLA	3935do			
0700-0800	Nigeria, Radio	3326do	4990do		
0700-0750	North Korea, R Pyongyang	15350as	17765as		
0700-0715	Romania, R Romania Intl	11810pa	11940pa	15335pa	17720pa
		17805pa	21665pa		
0700-0800	Russia, Radio Moscow	5905va	9490eu	9890va	12010af
		12055af	13650va	13705va	15190va
		15280af	15345af	15440eu	15465af
		15470af	15520af	15540va	15550af
		17580eu	17655af	17675af	17860eu
0700-0800 vl	S Africa, Radio Oranje	9630do			
0700-0800	Singapore, SBC1	5010do	5052do	11940do	
0700-0715	Switzerland, Swiss R Intl	3985eu	6165eu	9535eu	
0700-0800	Taiwan, VO Free China	5950na			
0700-0800 sa	Thailand, Radio	9655as	11905as		
0700-0730	United Kingdom, BBC London	3955na	5970eu	5975na	6025eu
		6195eu	7150pa	7325af	9410eu
		9640va	9750eu	11940af	15325eu
		15360pa	17885va	21470va	
0700-0800	USA, CSMonitor Boston MA	5850eu	7395am	445na	9870am
		17555as	17780as		
0700-0800	USA, KTBN Salt LK City UT	7510na			
0700-0800	USA, KVOH Los Angeles CA	9785na			
0700-0800	USA, WHRI Noblesville IN	7315eu			
0700-0800	USA, WJCR Upton KY	7490na	9495na	13595na	
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WWCR Nashville TN	5935va	7435am		
0700-0800	USA, WYFR Okeechobee FL	5985va	7355va	9680va	11915af
		13695eu			
0703-0715 s	Croatia, Croatian Radio	6210eu	9830eu	13830eu	
0730-0800	Australia, Radio	6020pa	11720pa	11880pa	15240pa
		15365pa	17630as	17750as	21525as
		21590as			
0730-0755	Belgium, R Vlaanderen	5910eu	9905va	11695pa	
0730-0800	Czechoslovakia, Radio	17725pa	21705as		
0730-0745 mtwhf	Iceland, Natl BC Service	92650m			
0730-0735	India, All India Radio	15250as	17850as		
0730-0800	Italy, AWR Europe	7210eu			
0730-0800	Netherlands, Radio	9630pa	11895pa		
0730-0800	United Kingdom, BBC London	5970eu	6195na	7150pa	7325eu
		9410eu	9640va	9660va	9750eu
		9760eu	9915af	15310va	15420va
		17790va	17830va	17885va	
0730-0745 mtwhfa	Vatican State, Vatican R	6245do	7250do	9645na	15210na
0745-0800	Finland, Radio	6120af	9560me	11755eu	

0800 UTC [3:00 AM EST/12:00 AM PST]

0800-0900	Australia, ABC Brisbane	9660do			
0800-0900	Australia, ABC Perth	15425va			
0800-0830	Australia, Radio	5995pa	6020pa	9580pa	9710pa
		15240pa	17630as	21590as	25750as
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica, RFPI Santa Ana	13630am	15030na		
0800-0900	Ecuador, HCJB Quito	6205eu	11835eu	11925eu	21455eu
0800-0900	Ghana, GBC Radio 1	4915do			
0800-0900 f	Ghana, GBC Radio 2	3366do			
0800-0900 asmtwh	Guam, KTWR	15200as			
0800-0900 irreg	Italy, IRRS Milan	7125eu			
0800-0900	Kenya, Voice of	4935do			
0800-0900	Lebanon, King of Hope	6280me			
0800-0900 smtwha	Malaysia, RTM Radio 4	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295as	
0800-0835	Monaco, TWR Monte Carlo	9480eu			
0800-0830	Neth Antilles, TWR Bonaire	11815am	15345am		
0800-0825	Netherlands, Radio	9630pa	11895pa		
0800-0900	New Zealand, R NZ Intl	9630pa	11900pa		
0800-0900	New Zealand, ZXLA	3935do			
0800-0900	Nigeria, Radio	3326do	4990do		
0800-0900	Nigeria, Voice of	7255af			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0845	Pakistan, Radio	17900eu	21520eu		
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia, Radio Moscow	4940af	4975af	6110af	7130af
		9580va	11765af	12010va	12020va
		12055af	12070eu	13650va	13705va
		15190eu	15210va	15345va	15440va
		17675af	17805af	17860va	21655af
0800-0900	S Africa, Radio Oranje	9630do			
0800-0900	Singapore, SBC1	5010do	5052do	11940do	
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, Radio Korea	7550eu	13670eu		
0800-0830	United Kingdom, BBC London	6190na	7150pa	9750eu	11940af
		15280as	15360pa	15400na	15420va
		17640va	17790va	17830va	17885va
0800-0900	USA, CSMonitor Boston MA	9445am	9455am	9840am	11705eu
		13615as	15665pa		
0800-0900	USA, KNLS Anchor Point AK	7365as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, VOA Washington DC	11735eu	15160eu	15195me	21455me
		21570me			
0800-0900	USA, WHRI Noblesville IN	7315eu			
0800-0900	USA, WJCR Upton KY	7490na	13595na		
0800-0900 smtwhf	USA, WMLK Bethel PA	9465eu			
0800-0900	USA, WWCR Nashville TN	5935va	7435am		
0800-0900	Australia, Radio	5995na	6020pa	6080pa	9580pa
		9710pa	15240pa	17630as	17750as
		21590as			
0830-0900	Austria, R Austria Intl	6155eu	13730eu	15450au	21490as
0830-0900	Ecuador, HCJB Quito	9745au	11925au	15270eu	21455au
0830-0900	Finland, Radio	17800as	21550as		
0830-0900	India, All India Radio	7250as	9610as	11970as	15250as
		17850as			
0830-0900	Netherlands, Radio	9630pa	11895pa		
0830-0900	United Kingdom, BBC London	6190va	6195eu	7325va	9750eu
		11940eu	15280as	15360pa	15360pa
		15400va	15420va	15575va	17640va
		17790as	17830va	17885va	
0830-0845	Vatican State, Vatican R	6245eu	7250eu	9645eu	15210eu
0835-0850 smtwhf	Monaco, TWR Monte Carlo	9480eu			
0850-0900 s	Monaco, TWR Monte Carlo	9480eu			

## 0900 UTC [4:00 AM EST/1:00 AM PST]

0900-1000	Australia, ABC Brisbane	4920do	9660do		
0900-1000	Australia, Radio	5995pa	6020pa	9510pa	9580pa
		13605as	15170as	21725as	
0900-1000 s	Bhutan, BC Service	6035do			
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-1000	China, China Radio Intl	11755au	15440au	17710au	
0900-0930	Costa Rica, RFPI Santa Ana	7375na	13630am	15030na	
0900-1000	Ecuador, HCJB Quito	9745au	11925au	21455au	
0900-1000	Finland, Radio	17800as	21550as		
0900-0950	Germany, Deutsche Welle	6160as	11715as	11915as	15410af
		17780as	17820as	21465as	21600af
		21650as	21680as		
0900-0905	Ghana, GBC Radio 1	4915do			
0900-0905 f	Ghana, GBC Radio 2	3366do			
0900-1000	Guam, KTWR	11805pa			
0900-0910	India, All India Radio	9610as	11970as	15250as	17850as
0900-1000 s	Italy, AWR Europe	7230eu			
0900-1000 irreg	Italy, IRRS Milan	7125eu			
0900-1000	Japan, Radio	11815eu	11840eu	15270au	17860as
		21610as			
0900-1000	Kenya, Voice of	4935do			
0900-1000	Lebanon, King of Hope	6280me			
0900-1000	Malaysia, RTM Radio 4	7295do			
0900-0915 s	Monaco, TWR Monte Carlo	9480eu			
0900-0925	Netherlands, Radio	9630pa	11895pa		
0900-1000	New Zealand, R NZ Intl	9700pa			
0900-0930 mtwhf	New Zealand, ZLXA	3935do			
0900-1000	Nigeria, Radio	3326do	4990do		
0900-1000	Nigeria, Voice of	7255af			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Philippines, FEBC Manila	9800as	11685as		
0900-1000	Russia, Radio Moscow	4940af	6110af	7130af	9755af
		11765af	12010va	12020va	12055af
		12070va	13650va	15175va	15210va
		15435va	15440va	15540va	17565va
		17860va	21755va	21825af	21845af
0900-1000 vl	S Africa, Radio Oranje	9630do			
0900-1000	Singapore, SBC1	5010do	5052do	11940do	
0900-0930	Switzerland, Swiss R Intl	9560pa	13685pa	17670pa	21770pa
0900-0930	United Kingdom, BBC London	6190as	6195eu	7180eu	9410eu
		9740eu	9750eu	11765as	15190am
		15575va	17640va	17705va	17790va
0900-1000	USA, CSMonitor Boston MA	9445am	9455am	9840eu	11705eu
		13615pa	15665pa		
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, VOA Washington DC	11735eu	15160eu	15195me	17770eu
0900-1000	USA, WJCR Upton KY	7490na	13595na		
0900-1000 smtwhf	USA, WMLK Bethel PA	9465eu			



## Radio Norway Cutback

In February, Radio Norway reduced its English programming back to its Sunday transmission. A note from the station explains, "We hope to be able to keep the best from both broadcasts, but the feature programmes on various aspects of life in Norway will have to be considerably shorter."

"In spite of the really overwhelming support we have received from listeners all over the world, it has so far not been possible to reverse the decision by the Norwegian Foreign Office to withdraw their financial support. But, let it be said with strength, we haven't given up hope; our aim is to be back with two English programmes a week—at least!"

0900-1000	USA, WWCR Nashville TN	5935va	7435am		
0905-1000 sa	Ghana, GBC Radio 1	4915do			
0905-1000 mtwhf	Ghana, GBC Radio 2	3366do	7295do		
0905-1000 sa	Ghana, GBC Radio 2	3366do			
0910-0940 smwha	Mongolia, R Ulaanbaatar	11850pa	12015pa		
0915-0930 smtwh	Guam, KTWR	15200as			
0930-0945	India, All India Radio	9610as	11970as	15250as	17850as
0930-1000	Netherlands, Radio	9630pa	9720pa	11895pa	
0930-1000	United Kingdom, BBC London	5975eu	6190na	6195na	7180as
		9410as	9740eu	9750eu	9760eu
		11765as	15575va	17640va	17705va
0940-0950	Greece, Voice of	17525eu			

## 1000 UTC [5:00 AM EST/2:00 AM PST]

1000-1100	Australia, Radio	5995pa	9580pa	21725as	
1000-1025 mtwhf	Belgium, R Vlaanderen	5910eu	9905eu		
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	11755au	15440au	17710au	
1000-1100	Costa Rica, AWR Alajuela	9725ca			
1000-1100	Costa Rica, RFPI Santa Ana	7375na	13630na	15030na	
1000-1100	Ecuador, HCJB Quito	9745au	11925au	21455au	
1000-1100 sa	Ghana, GBC Radio 1	4915do			
1000-1100 mtwhf	Ghana, GBC Radio 2	7295do			
1000-1100 sa	Ghana, GBC Radio 2	3366do			
1000-1100	India, All India Radio	15050as	17387as	17895as	21735as
1000-1100	Italy, AWR Europe	7230eu			
1000-1100 irreg	Italy, IRRS Milan	7125eu			
1000-1100	Kenya, Voice of	4935do			
1000-1100	Malaysia, RTM Kuching	7160do			
1000-1100 mtwhf	Malaysia, RTM Radio 4	7295do			
1000-1025	Netherlands, Radio	9630pa	11895pa		
1000-1100	New Zealand, R NZ Intl	9700pa			
1000-1100	Nigeria, Radio	4990do	7285do		
1000-1100	Nigeria, Voice of	7255af			
1000-1100	Philippines, FEBC Manila	9800as	11685as		
1000-1100	Russia, Radio Moscow	4975af	6110af	7130af	11765af
		12010eu	12020eu	12070va	13650va
		15175va	15210va	15345eu	15440va
		15465va	15475va	15550af	17565va
		17600eu	17805eu	21550eu	21755va
1000-1100	S Africa, Channel Africa	11900af			
1000-1100 vl	S Africa, Radio Oranje	9630do			
1000-1100	Singapore, SBC1	5010do	5052do	11940do	
1000-1030	United Kingdom, BBC London	5975eu	6190eu	6195eu	9410as
1000-1100	USA, CSMonitor Boston MA	9455am	9495na	13625as	17555as
1000-1100	USA, VOA Washington DC	5985as	11720au	15425au	
1000-1100	USA, WHRI Noblesville IN	9850sa			
1000-1100	USA, WJCR Upton KY	7490na	13595na		
1000-1100	USA, WWCR Nashville TN	5935va	15685va		
1000-1100	USA, WYFR Okeechobee FL	5950am			
1000-1030	Vietnam, Voice of	9840as	12020as	15010as	
1030-1100	Austria, R Austria Intl	6155eu	13730as	15450as	21490pa
1030-1100	Iran, VOIRI Tehran	9525as	11715af	11790as	11910as
		11930me			
1030-1100	South Korea, Radio Korea	11715na			
1030-1100	Sri Lanka, SLBC Colombo	11835as	15120as	17850as	
1030-1100	UAE, UAE Radio Dubai	13675eu	15320eu	15435eu	21605eu
1030-1100	United Kingdom, BBC London	5975eu	6190eu	6195eu	9410as
		9740as	9750as	9760as	15190am
		15310va	15420va	15575va	17640va
1040-1050	Greece, Voice of	15650as	17885va	21470va	
1055-1100	Neth Antilles, TWR Bonaire	11815am	15345am		

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Monitoring Times

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Bill Clarke  
73 Amateur Radio Today



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1100 UTC

[6:00 AM EST/3:00 AM PST]

## FREQUENCIES

1100-1200	Australia, Radio	5995pa 9710pa	6020pa	6080pa	9580pa	1100-1130	Switzerland, Swiss R Intl	6165eu 17670as	9535eu	13635as	15505as
1100-1200	Canada, CFCX Montreal	6005do				1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200	Canada, CFRX Toronto	6070do				1100-1130	United Kingdom, BBC London	5965na	6190na	6195eu	9410as
1100-1200	Canada, CFVP Calgary	6030do						9700eu	9740as	9750eu	9760eu
1100-1200	Canada, CHNX Halifax	6130do						15310na	15420va	15575va	17640va
1100-1200	Canada, CKZU Vancouver	6160do						17705va	17790va	17885va	21470va
1100-1200	Costa Rica, AWR Alajuela	9725ca	11870ca			1100-1200	USA, CSMonitor Boston MA	9455am	9495na	13625as	17555as
1100-1200	Costa Rica, RFPI Santa Ana	7375na	13630na	15030na		1100-1200 sa	USA, CSMonitor Boston MA	13770eu			
1100-1130	Ecuador, HCJB Quito	9745au	11925au	15155au	21455au	1100-1200	USA, KTBN Salt Lk City UT	7510na			
1100-1150	Germany, Deutsche Welle	15410af	17765af	17800af	17860af	1100-1200	USA, VOA Washington DC	5985as	9590as	9760as	11915au
		21465af	21600af					15120au			
1100-1200	Ghana, GBC Radio 1	4915do				1100-1200	USA, WHRI Noblesville IN	7315na	9850sa	11790sa	
1100-1110 mtwhf	Ghana, GBC Radio 2	7295do				1100-1200	USA, WJCR Upton KY	7490na	13595na		
1100-1200 sa	Ghana, GBC Radio 2	3366do				1100-1200	USA, WWCR Nashville TN	5935va	15685va		
1100-1130	Iran, VOIRI Tehran	9525af	11515af	11790as	11910as	1100-1200	USA, WYFR Okeechobee FL	5950am	7355am		
		11930me				1100-1130	Vietnam, Voice of	7416as	19732as		
1100-1130	Israel, Kol Israel	17545eu				1115-1145	Nepal, Radio	3230as	5005as	7165as	
1100-1200 irreg	Italy, IRRS Milan	7125eu				1120-1130 mtwhf	Vatican State, Vatican R	6245eu	7250eu	11740eu	15210eu
1100-1200	Japan, Radio	6120na	11815sa	11840na		1125-1130 sa	Botswana, Radio	5955af	7255af		
1100-1200	Malaysia, RTM Radio 4	7295do				1130-1200	Austria, R Austria Intl	6155eu	11780as	13730va	15450as
1100-1200	Neth Antilles, TWR Bonaire	11815am	15345am			1130-1200	Bulgaria, Radio Sofia	11630eu	11720eu	13670eu	17780eu
1100-1200	New Zealand, R NZ Intl	9700as				1130-1157	Czechoslovakia, Radio	6055eu	7345eu	9505eu	11990eu
1100-1150	North Korea, R Pyongyang	6576na	9977na	11335na		1130-1200	15355eu				
1100-1120	Pakistan, Radio	17595eu	17900eu	21520eu		1130-1200	Ecuador, HCJB Quito	11925am	15115am	17890am	21455am
1100-1200	Russia, Radio Moscow	9705va	9780va	9855va	11675va	1130-1200	Netherlands, Radio	5955eu			
		11710va	12020na	12070va	13650va	1130-1200	South Korea, Radio Korea	9650na			
		15435va	15470va	15475va	15530va	1130-1200	Thailand, Radio	4830as	9655as	11905as	
		15550va	15585va	17570va	17600va	1130-1200	United Kingdom, BBC London	5965na	6190eu	6195eu	9410eu
1100-1200	S Africa, Channel Africa	11900af				1130-1200		9740eu	9750eu	15220na	15420va
1100-1200 vl	S Africa, Radio Oranje	9630do				1135-1140	India, All India Radio	17705va	17885va	21470va	21660af
1100-1200	Singapore, SBC1	5010do	5052do	11940do				9675as	11770as	11970as	17705as
1100-1200	South Korea, Radio Korea	15575af						17815as			
1100-1130	Sri Lanka, SLBC Colombo	11835as	15120as	17850as							

## SELECTED PROGRAMS

## Sundays

1105 Christian Science Monitor: Christian Science Sentinel. See S 005.  
 1130 BBC: The Ken Bruce Show. See S 0030.  
 1135 Radio Netherlands: Happy Station. See S 0135.

## Mondays

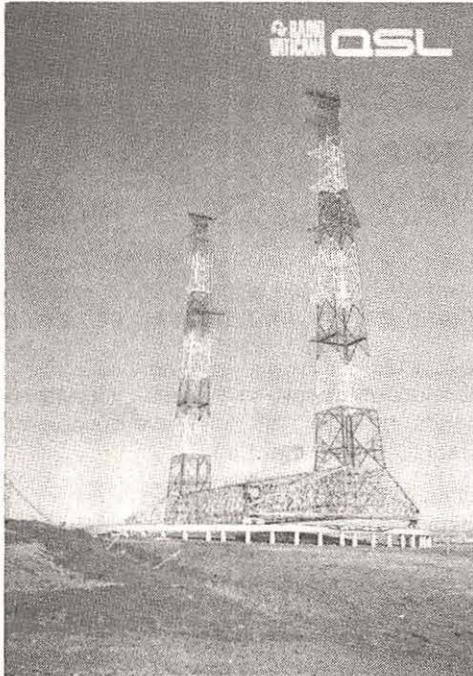
1106 Christian Science Monitor: Encore. See M 0106.  
 1130 BBC: Composer Of The Month. See M 0230.  
 1134 Christian Science Monitor: Letterbox. See M 0134.  
 1135 Radio Netherlands: Newsline. See S 0035.  
 1147 Christian Science Monitor: Religious Article. See M 0147.  
 1150 Radio Netherlands: Research File. The latest developments in science and technology.

## Tuesdays

1106 Christian Science Monitor: Home Forum. See M 2306.  
 1130 BBC: Megamix. Music, sports, fashion, health, travel, news, and opinion for young people.  
 1134 Christian Science Monitor: Letterbox. See M 0134.  
 1135 Radio Netherlands: Newsline. See S 0035.  
 1147 Christian Science Monitor: Religious Article. See M 0147.  
 1150 Radio Netherlands: Mirror Images. An arts magazine, featuring film, theatre, opera, books, and music.

## Wednesdays

1106 Christian Science Monitor: Curtain Call. See T 2306.  
 1130 BBC: Meridian. See W 0630.  
 1134 Christian Science Monitor: Letterbox. See M 0134.



John Carson, Norman, OK, sends us this Radio Vatican QSL from his extensive collection.

1135 Radio Netherlands: Newsline. See S 0035.  
 1147 Christian Science Monitor: Religious Article. See M 0147.  
 1150 Radio Netherlands: Feature Documentary. Topical programming.

## Thursdays

1106 Christian Science Monitor: Kaleidoscope. See W 2306.  
 1130 BBC: Drama. This month, Edward de Souza tells a series of spine-chilling tales in "The Man In Black."  
 1134 Christian Science Monitor: Letterbox. See M 0134.  
 1135 Radio Netherlands: Newsline. See S 0035.  
 1147 Christian Science Monitor: Religious Article. See M 0147.  
 1150 Radio Netherlands: Media Network. See H 0150.

## Fridays

1106 Christian Science Monitor: Arts Forum or Sportsworld. See H 2306.  
 1130 BBC: Meridian. See W 0630.  
 1134 Christian Science Monitor: Letterbox. See M 0134.  
 1135 Radio Netherlands: Newsline. See S 0035.  
 1147 Christian Science Monitor: Religious Article. See M 0147.  
 1150 Radio Netherlands: Toward 2000. A look at social affairs in Northern Europe.

## Saturdays

1105 Christian Science Monitor: Christian Science Sentinel. See S 005.  
 1130 BBC: Meridian. See W 0630.  
 1135 Radio Netherlands: Newsline. See S 0035.  
 1150 Radio Netherlands: Sounds Interesting. See S 0050.

1200UTC

[7:00 AM EST/4:00 AM PST]

## FREQUENCIES

1200-1300	Australia, ABC Brisbane	4920au		1200-1230	Thailand, Radio	9655as	11905as	
1200-1300	Australia, ABC Katherine	2485do		1200-1230	United Kingdom, BBC London	5965eu	6190na	6195na
1200-1300	Australia, ABC Perth	6140do	9610do			13660eu	15220va	15310pa
1200-1300	Australia, Radio	5995pa	7240pa	9580pa	21725as	15520na	17640va	17790va
1200-1300	Brazil, Radiobras	15445am				21470va		
1200-1300	Canada, CFCX Montreal	6005do		1200-1300	USA, CSMonitor Boston MA	9425au	9495am	13625as
1200-1300	Canada, CFRX Toronto	6070do		1200-1300 as	USA, CSMonitor Boston MA	15665eu		
1200-1300	Canada, CFVP Calgary	6030do		1200-1300	USA, KTBN Salt Lk City UT	7510am		
1200-1300	Canada, CHNX Halifax	6130do		1200-1300	USA, VOA Washington DC	6110as	9760au	11715as
1200-1300	Canada, CKZU Vancouver	6160do				15425as		
1200-1300	China, China Radio Int'l	9655na	9715as	11660as	1200-1300	USA, WHRI Noblesville IN	7315na	9850sa
		15210na	15440pa	11795pa	1200-1300	USA, WJCR Upton KY	7490na	13595na
1200-1300	Costa Rica, AWR Alajuela	9725ca	11870ca		1200-1300	USA, WWCR Nashville TN	5935va	15685va
1200-1300	Costa Rica, RFPI Santa Ana	7375na	13630na	15030na	1200-1300	USA, WYFR Okeechobee FL	5950am	6015am
1200-1300	Ecuador, HCJB Quito	11925am	15115am	17890am	1200-1300		7355am	11830am
1200-1300	Ghana, GBC Radio 1	4915do			1200-1300	Uzbekistan, R Tashkent	5945as	9540as
1200-1225 sa	Ghana, GBC Radio 2	3366do			1208-1300	New Zealand, R NZ Int'l	9510as	
1200-1300 irreg	Italy, IRRS Milan	7125eu			1215-1300	Egypt, Radio Cairo	17595as	
1200-1300	Kenya, Voice of	4935do			1215-1300	South Korea, Radio Korea	9750am	
1200-1300	Malaysia, RTM Radio 4	7295do			1226-1300	Ghana, GBC Radio 2	7295do	
1200-1230 smwha	Mongolia, R Ulaanbaatar	11850as	12015as		1230-1300	Austria, R Austria Int'l	6155eu	13730na
1200-1300	Neth Antilles, TWR Bonaire	11815am	15345am		1230-1300	Bangladesh, Radio	15200eu	17750eu
1200-1225	Netherlands, Radio	5955eu			1230-1255	Belgium, R Vlaanderen	17555as	21810na
1200-1205	New Zealand, R NZ Int'l	9700as			1230-1250 mtwhf	Finland, Radio	11735na	15400na
1200-1300	Nigeria, Radio	4990do	7285do		1230-1255	France, Radio France Int'l	9805eu	11670eu
1200-1300	Nigeria, Voice of	7255af			1230-1235	India, All India Radio	15365na	21645na
1200-1230 as	Norway, Radio Norway Int'l	17860as	21705as		1230-1300		3925do	4860do
1200-1300	Palau, KHBN	9830va			1230-1300	Netherlands, Radio	17850as	
1200-1300	Russia, Radio Moscow	7370va	9705va	9745va	1230-1300	Sri Lanka, SLBC Colombo	5955eu	
		9855va	11710va	11980va	1230-1300	United Kingdom, BBC London	6075as	9720as
		13650va	15175va	15210va	1230-1300		6045eu	6195ca
		15435va	15465va	15475va	1230-1300		9560eu	9600eu
		15585va	17570va	17735va	1230-1300		9635eu	9740na
				21755va	1230-1300		11680eu	11710na
					1230-1300	Vietnam, Voice of	11845na	12095eu
1200-1300 vl	S Africa, Radio Oranje	9630do			1230-1300		15115eu	15220na
1200-1300	Singapore, SBC1	5010do	5052do	11940do	1235-1245	Yugoslavia, Radio	12020as	15010as
					1235-1245	Greece, Voice of	17740na	21605na
							15635na	15650na
							17515na	

## SELECTED PROGRAMS

## Sundays

1201 BBC: Play Of The Week. See S 0101.  
 1205 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 1215 China Radio Int'l: Sports Beat. News from the world of sports.  
 1220 China Radio Int'l: China Anthology. Episodes from China's past, with profiles of historical figures.  
 1228 China Radio Int'l: Music Album. A combination of traditional and Western musical selections.  
 1235 Radio Netherlands: East Of Edam. See S 0235.  
 1240 China Radio Int'l: Listeners' Letterbox. Listener letters and information about China.

## Mondays

1206 Christian Science Monitor: News Features And Interviews. See M 0006.  
 1209 BBC: Words Of Faith. Speakers from various faiths discuss scripture and their beliefs.  
 1215 BBC: Quiz. This month, general musical knowledge is tested in "Ned Sherrin's Counterpoint."  
 1215 China Radio Int'l: The Business Show or China's Open Windows. News on Chinese industry or trade.  
 1225 Radio Netherlands: Press Review. A review of stories from the Dutch press.  
 1235 Radio Netherlands: Newsline. See S 0035.  
 1240 China Radio Int'l: Learn To Speak Chinese. Chinese language lessons for English speakers.  
 1245 BBC: Sports Roundup. See S 0315.  
 1250 Radio Netherlands: Let's Get To Business. Barry O'Dwyer explores the world of business.

## Tuesdays

1206 Christian Science Monitor: News Features And Interviews.

## See M 0006.

1209 BBC: Words Of Faith. See M 1209.  
 1215 BBC: Multitrack 1. See M 2330.  
 1215 China Radio Int'l: Current Affairs. An in-depth look at events and happenings in China.  
 1225 Radio Netherlands: Press Review. See M 1225.

## See M 0035.

1235 Radio Netherlands: Newsline. See S 0035.

## See M 1240.

1240 China Radio Int'l: Listener's Letterbox. See S 1240.

## See S 0315.

1250 Radio Netherlands: No Boundaries. See T 0150.

## See M 0006.

1209 BBC: Words Of Faith. See M 1209.

## See M 1615.

1215 China Radio Int'l: Current Affairs. See T 1215.

## See M 1225.

1225 Radio Netherlands: Press Review. See M 1225.

## See M 1635.

1235 Radio Netherlands: Newsline. See S 0035.

## See M 1240.

1240 China Radio Int'l: Learn To Speak Chinese. See M 1240.

## See S 0315.

1250 BBC: Sports Roundup. See S 0315.

## See W 0150.

1250 Radio Netherlands: Encore! See W 0150.

## See M 0006.

1209 BBC: Words Of Faith. See M 1209.

## See W 2330.

1215 China Radio Int'l: Current Affairs. See T 1215.

## See M 1225.

1225 Radio Netherlands: Press Review. See M 1225.

## See S 0035.

1235 Radio Netherlands: Newsline. See S 0035.

## See M 1240.

1240 China Radio Int'l: Culture In China. The rich cultural heritage of China, as manifested in literature and art.

## See S 0315.

1250 Radio Netherlands: Research File. See M 1150.

## Fridays

1206 Christian Science Monitor: News Features And Interviews. See M 0006.  
 1209 BBC: Words Of Faith. See M 1209.  
 1215 BBC: Feature. This month, South Asia is the motif: "The Roof Of The World" (5th); "The Gurkhas" (12th); "Paradise For Some — Tourism In South Asia" (19th); "Sustainable Technology" (26th).  
 1215 China Radio Int'l: Current Affairs. See T 1215.  
 1225 Radio Netherlands: Press Review. See M 1225.  
 1235 Radio Netherlands: Newsline. See S 0035.  
 1240 China Radio Int'l: In The Third World. Reports and music from developing nations.  
 1245 BBC: Sports Roundup. See S 0315.  
 1250 Radio Netherlands: Feature Documentary. See W 1150.

## Saturdays

1205 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 1209 BBC: Words Of Faith. See M 1209.  
 1215 BBC: Multitrack 3. See F 2330.  
 1215 China Radio Int'l: Press Clippings. See S 0015.  
 1220 China Radio Int'l: Travel Talk. See S 0020.  
 1225 Radio Netherlands: Press Review. See M 1225.  
 1228 China Radio Int'l: Cooking Show. See S 0028.  
 1235 China Radio Int'l: Music From China. See S 0035.  
 1235 Radio Netherlands: Newsline. See S 0035.  
 1245 BBC: Sports Roundup. See S 0315.  
 1250 Radio Netherlands: Airtime Africa. Analysis of issues that concern both Europe and Africa.

1300 UTC

[8:00 AM EST/5:00 AM PST]

## FREQUENCIES

1300-1400	Australia, ABC Alice Sprg	2310do	1300-1400	S Africa, Radio Oranje	9630do	
1300-1400	Australia, ABC Brisbane	4920do	1300-1400	Singapore, SBC1	5010do	5052do
1300-1400	Australia, ABC Katherine	2485do	1300-1315	South Korea, Radio Korea	9750na	11940do
1300-1400	Australia, ABC Perth	9610do	1300-1400	Sri Lanka, SLBC Colombo	6075as	9720as
1300-1400	Australia, ABC Tennant Cr	2325do	1300-1400	Sweden, Radio	15240as	21625pa
1300-1400	Australia, Radio	5995pa 7240pa 9580pa 11800pa	1300-1330	Switzerland, Swiss R Intl	7480as	11690as 13635as 15505as
		11855as 13755as			17670as	21820as
1300-1320	Brazil, Radiobras	15445am	1300-1330	United Kingdom, BBC London	5965am	6190eu 6195eu 7180as
1300-1400	Canada, CFCX Montreal	6005do			9410eu	9515eu 9750eu 15220am
1300-1400	Canada, CFRX Toronto	6070do			15575va	17640va 17705va 17790va
1300-1400	Canada, CFVP Calgary	6030do			21470va	
1300-1400	Canada, CHNX Halifax	6130do	1300-1400	USA, CSMonitor Boston MA	9425au	9495am 13625as 13760na
1300-1400	Canada, CKZU Vancouver	6160do	1300-1400	USA, CSMonitor Boston MA	15665eu	
1300-1400 mtwthf	Canada, RCI Montreal	9635na 11855na 17820am	1300-1400	USA, KNLS Anchor Point AK	7355as	
1300-1400	China, China Radio Intl	7405na 9715as 11660va 15440pa	1300-1400	USA, KTBN Salt Lk City UT	7510am	
1300-1400	Costa Rica, RFPI Santa Ana	7375am 13630na 15030na	1300-1330	USA, VOA Washington DC	6110as	9760au 11715as 15155au
1300-1400	Ecuador, HCJB Quito	11925am 15115am 17890am 21455am			15425au	
1300-1330	Egypt, Radio Cairo	17595as	1300-1400	USA, WHRI Noblesville IN	9465na	11790na
1300-1325	Kenya, Voice of	4935do	1300-1400	USA, WJCR Upton KY	7490na	13595na
1300-1400	Lebanon, Wings of Hope	11530me	1300-1400	USA, WWCR Nashville TN	5935va	15685va
1300-1400	Malaysia, RTM Radio 4	7295do	1300-1400	USA, WYFR Okeechobee FL	5950am	9705na 11830am 13695na
1300-1330	Neth Antilles, TWR Bonaire	11815am 15345am			17760am	
1300-1325	Netherlands, Radio	5955eu	1320-1400	Jordan, Radio	9560eu	
1300-1400	New Zealand, R NZ Intl	9510as	1325-1400 mtwthf	Kenya, Voice of	4935do	
1300-1400	Nigeria, Radio	4990do 7285do	1330-1400	Austria, R Austria Intl	15450as	17730as
1300-1400	Nigeria, Voice of	7255af	1330-1357	Canada, RCI Montreal	6150as	9535as
1300-1350	North Korea, R Pyongyang	9345eu 9640as 13760am 15230as	1330-1400	Finland, Radio	15400na	21550na
1300-1330 as	Norway, Radio Norway Intl	9590eu 25730af	1330-1400	India, All India Radio	9665as	11760as 15120as
1300-1400	Palau, KHBN	9830va	1330-1400	Netherlands, Radio	13770as	17610as
1300-1400	Philippines, FEBC Manila	11995as	1330-1400	Turkey, Voice of	9675as	
1300-1355	Poland, Polish R Warsaw	6135eu 7145eu 9525eu 11815eu	1330-1400	UAE, UAE Radio Dubai	13675eu	15320eu 15435as 21605as
1300-1400	Romania, R Romania Intl	11940eu 15365eu 17720eu 17850eu	1330-1400	United Kingdom, BBC London	5965am	6190na 6195am 7180af
1300-1400	Russia, AWR Russia	11855as			9410na	9515na 9740as 15070va
1300-1400	Russia, Radio Moscow	7330va 7370va 7380va 9705va	1330-1400		15220na	15310va 15575me 21660af
		9715va 9755va 890va 11710va	1330-1400	USA, VOA Washington DC	6110as	9760as 15155au 15425au
		15480va 15510va 15520va 15540va	1330-1400	Uzbekistan, R Tashkent	7325as	9750as 15460as 17815as
		15550va 17570va 17600va 17735va	1330-1400	Vietnam, Voice of	9840as	12020as 15010as
		17840va 17860va 21610va 21785va	1345-1400	Vatican State, Vatican R	15090au	17525au 21515au

## SELECTED PROGRAMS

## Sundays

1305 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 1315 China Radio Int'l: Sports Beat. See S 1215.  
 1320 China Radio Int'l: China Anthology. See S 1220.  
 1328 China Radio Int'l: Music Album. See S 1228.  
 1335 Radio Netherlands: Happy Station. See S 0135.  
 1340 China Radio Int'l: Listeners' Letterbox. See S 1240.

## Mondays

1305 Radio Netherlands: CDutch. Harry Kliphuis with the latest classical-music releases.  
 1306 Christian Science Monitor: Encore. See M 0106.  
 1315 China Radio Int'l: The Business Show or China's Open Windows. See M 1215.  
 1334 Christian Science Monitor: Letterbox. See M 0134.  
 1335 Radio Netherlands: Newsline. See S 0035.  
 1340 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 1347 Christian Science Monitor: Religious Article. See M 0147.  
 1350 Radio Netherlands: Research File. See M 1150.

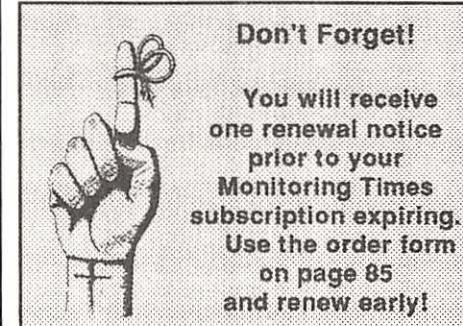
## Tuesdays

1306 Christian Science Monitor: Home Forum. See M 2306.  
 1315 China Radio Int'l: Current Affairs. See T 1215.  
 1334 Christian Science Monitor: Letterbox. See M 0134.  
 1335 Radio Netherlands: Newsline. See S 0035.  
 1340 China Radio Int'l: Listeners' Letterbox. See S 1240.

1347 Christian Science Monitor: Religious Article. See M 0147.  
 1350 Radio Netherlands: No Boundaries. See T 0150.

## Wednesdays

1306 Christian Science Monitor: Curtain Call. See T 2306.  
 1315 China Radio Int'l: Current Affairs. See T 1215.  
 1334 Christian Science Monitor: Letterbox. See M 0134.  
 1335 Radio Netherlands: Newsline. See S 0035.  
 1340 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 1347 Christian Science Monitor: Religious Article. See M 0147.  
 1350 Radio Netherlands: Feature Documentary. See W 1150.



## Thursdays

1306 Christian Science Monitor: Kaleidoscope. See W 2306.  
 1315 China Radio Int'l: Current Affairs. See T 1215.  
 1334 Christian Science Monitor: Letterbox. See M 0134.  
 1335 Radio Netherlands: Newsline. See S 0035.  
 1340 China Radio Int'l: Culture In China. See H 1240.  
 1347 Christian Science Monitor: Religious Article. See M 0147.  
 1350 Radio Netherlands: Media Network. See H 0150.

## Fridays

1306 Christian Science Monitor: Arts Forum or Sportsworld. See H 2306.  
 1315 China Radio Int'l: Current Affairs. See T 1215.  
 1334 Christian Science Monitor: Letterbox. See M 0134.  
 1335 Radio Netherlands: Newsline. See S 0035.  
 1340 China Radio Int'l: In The Third World. See F 1240.  
 1347 Christian Science Monitor: Religious Article. See M 0147.  
 1350 Radio Netherlands: Toward 2000. See F 1150.

## Saturdays

1305 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 1315 China Radio Int'l: Press Clippings. See S 0015.  
 1320 China Radio Int'l: Travel Talk. See S 0020.  
 1328 China Radio Int'l: Cooking Show. See S 0028.  
 1335 China Radio Int'l: Music From China. See S 0035.  
 1335 Radio Netherlands: Newsline. See S 0035.  
 1350 Radio Netherlands: Sounds Interesting. See S 0050.

1400 UTC

[9:00 AM EST/6:00 AM PST]

## FREQUENCIES

1400-1500	Australia, ABC Brisbane	4920do					9755na	9855va	9890va	11675va
1400-1500	Australia, Radio	5995pa	7240pa	9540pa	9580pa		11710va	11980va	15480va	15550va
		9770va	11800pa	11855pa			17730va	21610va	21755va	21785va
1400-1500	Australia, VLW6 Wanneroo	6140do				1400-1500 vi	S Africa, Radio Oranje	9630do		
1400-1430 mtwts	Belgium, R Vlaanderen	17550as	21810eu			1400-1500	Singapore, SBC1	5010do	5052do	11940do
1400-1500	Canada, CFCX Montreal	6005do				1400-1500	South Korea, Radio Korea	9570as		
1400-1500	Canada, CFRX Toronto	6070do				1400-1500	Sri Lanka, SLBC Colombo	6075as	9720as	
1400-1500	Canada, CFVP Calgary	6030do				1400-1430	United Kingdom, BBC London	6195as	7180as	9515na
1400-1500	Canada, CHNX Halifax	6130do						9740as	9740as	9750eu
1400-1500	Canada, CKZU Vancouver	6160do						11860af	15260na	21490am
1400-1500 s	Canada, RCI Montreal	11955am	17820am			1400-1500	USA, CSMonitor Boston MA	9530as	13625as	13760am
1400-1500	China, China Radio Int'l	7405na	11815as	15165as					17510eu	17555am
1400-1500	Costa Rica, RFPI Santa Ana	7375na	13630na	15030am		1400-1500 sa	USA, CSMonitor Boston MA	13710na		
1400-1430	Ecuador, HCJB Quito	11925am	15115am	17890am	21455am	1400-1500	USA, KCBI Dallas TX	15375va		
1400-1500 as	Finland, Radio	15400na	21550na			1400-1500	USA, KTBN Salt Lk City UT	7510na		
1400-1430	Finland, Radio	15400na	21550na			1400-1500	USA, VOA Washington DC	6110as	9645au	9760as
1400-1500	France, Radio France Int'l	11910as	15405as	17650me					15160au	
1400-1500	Ghana, GBC Radio 1	4915do				1400-1500	USA, WHRI Noblesville IN	9465na	15105na	
1400-1500	Ghana, GBC Radio 2	7295do				1400-1500	USA, WJCR Upton KY	7490na	13595na	
1400-1500	India, All India Radio	9665as	11760as	15120as		1400-1500	USA, WWCR Nashville TN	13845na	15685va	
1400-1500	Iraq, Radio Iraq Int'l	13680as				1400-1500	USA, WYFR Okeechobee FL	6015am	9705na	11550as
1400-1425 smtwh	Israel, Kol Israel	11587am	11603na	15640na	15650as				11830am	
		17575eu	17590eu			1400-1415	Vatican State, Vatican R	15090au	17525au	21515au
1400-1500 irreg	Italy, IRRS Milan	7125eu				1415-1500	Bhutan, BC Service	5025do		
1400-1500	Japan, Radio	9535va	11815na			1415-1425	Nepal, Radio	3230do	5005do	7165do
1400-1500	Jordan, Radio	9560eu				1430-1500 mtwthf	Ecuador, HCJB Quito	11925am	17890am	21455am
1400-1500 mtwhf	Kenya, Voice of	4935do				1430-1435	Finland, Radio	15400na	21550na	
1400-1500	Lebanon, King of Hope	6280me				1430-1500	India, All India Radio	7290do	9950do	10330do
1400-1500	Malaysia, RTM Radio 4	4950do	7295do			1430-1500	Myanmar, VO Myanmar	5990do		
1400-1500	Malta, V of Mediterranean	11925eu				1430-1500	Netherlands, Radio	9895as	13770as	15150as
1400-1425	Netherlands, Radio	13770as	17610as			1430-1500	United Kingdom, BBC London	6195as	7180as	9515na
1400-1500	New Zealand, R NZ Int'l	9510as							9660eu	
1400-1500	Nigeria, Voice of	7255af				1430-1500 irreg	USA, KJES Albuquerque NM	11715na		
1400-1500	Philippines, FEBC Manila	11995as				1435-1440	India, All India Radio	7290do	10330do	
1400-1500	Russia, Radio Moscow	6065as	7170as	7260as	7330as	1445-1500 smwha	Mongolia, R Ulaanbaatar	7260as	13780as	
		7345as	7370va	7380as	9715va				12095eu	
									17840af	
									21660af	

## SELECTED PROGRAMS

## Sundays

1401 BBC: Feature. On tap this month: "It's Your World Phone-In" (7th, through 1500 UTC; dial 011-44-1-71-379-7444); "The Last Tigers" (14th, 21st); "Heritage" (through April 25th).  
 1405 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 1415 China Radio Int'l: Sports Beat. See S 1215.  
 1420 China Radio Int'l: China Anthology. See S 1220.  
 1428 China Radio Int'l: Music Album. See S 1228.  
 1430 BBC: Anything Goes. Bob Holness presents a variety of musical requests.  
 1435 Radio Netherlands: East Of Edam. See S 0235.  
 1440 China Radio Int'l: Listeners' Letterbox. See S 1240.

## Mondays

1405 BBC: Outlook. Conversation, controversy, and color from the UK and the world.  
 1406 Christian Science Monitor: News Features And Interviews. See M 0006.  
 1415 China Radio Int'l: The Business Show or China's Open Windows. See M 1215.  
 1430 BBC: Off The Shelf. See M 0430.  
 1435 Radio Netherlands: Newsline. See S 0035.  
 1440 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 1445 BBC: Musical Feature. See S 0445.  
 1450 Radio Netherlands: Let's Get To Business. See M 1250.

## Tuesdays

1405 BBC: Outlook. See M 1405.

1406 Christian Science Monitor: News Features And Interviews. See M 0006.

1415 China Radio Int'l: Current Affairs. See T 1215.

1430 BBC: Off The Shelf. See M 0430.

1435 Radio Netherlands: Newsline. See S 0035.

1440 China Radio Int'l: Listeners' Letterbox. See S 1240.

1445 BBC: Musical Feature. See M 0145.

1450 Radio Netherlands: Mirror Images. See T 1150.

## Wednesdays

1405 BBC: Outlook. See M 1405.

1406 Christian Science Monitor: News Features And Interviews. See M 0006.

1415 China Radio Int'l: Current Affairs. See T 1215.

1430 BBC: Off The Shelf. See M 0430.

1435 Radio Netherlands: Newsline. See S 0035.

1440 China Radio Int'l: Learn To Speak Chinese. See M 1240.

1445 BBC: Good Books. Recommendations of books to read.

1450 Radio Netherlands: Encore! See W 0150.

## Thursdays

1405 BBC: Outlook. See M 1405.

1406 Christian Science Monitor: News Features And Interviews. See M 0006.

1415 China Radio Int'l: Current Affairs. See T 1215.

1430 BBC: Off The Shelf. See M 0430.

1435 Radio Netherlands: Newsline. See S 0035.

1440 China Radio Int'l: Culture In China. See H 1240.

1445 BBC: Recording Of The Week. See M 0615.

1450 Radio Netherlands: Research File. See M 1150.

## Fridays

1405 BBC: Outlook. See M 1405.

1406 Christian Science Monitor: News Features And Interviews. See M 0006.

1415 China Radio Int'l: Current Affairs. See T 1215.

1430 BBC: Off The Shelf. See M 0430.

1435 Radio Netherlands: Newsline. See S 0035.

1440 China Radio Int'l: In The Third World. See F 1240.

1445 BBC: Global Concerns. See F 0145.

1450 Radio Netherlands: Feature Documentary. See W 1150.

## Saturdays

1401 BBC: John Peel. See T 0330.

1405 Christian Science Monitor: Christian Science Sentinel. See S 0005.

1415 China Radio Int'l: Press Clippings. See S 0015.

1420 China Radio Int'l: Travel Talk. See S 0020.

1428 China Radio Int'l: Cooking Show. See S 0028.

1430 BBC: Sportsworld. Extensive coverage and results of all the weekend's sports, including the Oxford-Cambridge Boat Race (27th).

1435 China Radio Int'l: Music From China. See S 0035.

1435 Radio Netherlands: Newsline. See S 0035.

1450 Radio Netherlands: Airtime Africa. See A 1250.

1500 UTC

[10:00 AM EST/7:00 AM PST]

## FREQUENCIES

1500-1600	Australia, ABC Brisbane	6140do				1500-1600	VI	S Africa, Radio Oranje	9630do	
1500-1600	Australia, Radio	5995pa	6060pa	7260pa	9580pa	1500-1555		Seychelles, FEBA	9810as	11710as
		9770pa	11800pa			1500-1600		Singapore, SBC1	5010do	5052do
1500-1600	Canada, CFCX Montreal	6005do				1500-1600		Sri Lanka, SLBC Colombo	6075as	9720as
1500-1600	Canada, CFRX Toronto	6070do				1500-1530		Switzerland, Swiss R Intl	13635af	15505af
1500-1600	Canada, CFVP Calgary	6030do				1500-1530		United Kingdom, BBC London	6195as	7180as
1500-1600	Canada, CHNX Halifax	6130do							9515na	9660as
1500-1600	Canada, CKZU Vancouver	6160do							9740na	9750eu
1500-1600 s	Canada, RCI Montreal	11955am	17820am						15260na	15310va
1500-1600	China, China Radio Intl	7405na	11815as	15165as		1500-1600		USA, CSMonitor Boston MA	9530as	13760pa
1500-1600	Costa Rica, RFI Santa Ana	7375am	13630am	15030am		1500-1600 sa		USA, CSMonitor Boston MA	13710na	
1500-1600	Ecuador, HCJB Quito	11925am	17890am	21455am		1500-1600		USA, KCBI Dallas TX	15375va	
1500-1550	Germany, Deutsche Welle	9735af	11965af	13610af	15145af	1500-1600		USA, KTBN Salt Lk City UT	7510na	15590na
		17735af	17765af			1500-1600		USA, VOA Washington DC	6110as	7125as
1500-1600	Guam, KTWR	15610as							9645as	9700eu
1500-1600	Iraq, Radio Iraq Intl	13680as				1500-1600		Austria, R Austria Intl	9760as	15205me
1500-1600	Japan, Radio	9535na	15355na			1500-1600		USA, WHRI Noblesville IN	9465na	15105na
1500-1600	Jordan, Radio	9560eu				1500-1600		USA, WJCR Upton KY	7490na	13595na
1500-1600	Malaysia, RTM Radio 4	4950do	7295do			1500-1600		USA, WWCR Nashville TN	13845na	15685va
1500-1600	Malta, V of Mediterranean	11925eu				1515-1530		USA, WYFR Okeechobee FL	11830am	15215am
1500-1515 smwha	Mongolia, R Ulaanbaatar	7260as	13780as					Canada, RCI Montreal	9555am	11915am
1500-1600	Myanmar, VO Myanmar	5990do				1530-1600			11935am	15315am
1500-1555	Neth Antilles, TWR Bonaire	11815am	15345am			1530-1540 mtwhfa		Austria, R Austria Intl	15325am	17820am
1500-1525	Netherlands, Radio	9895as	13770as	15150as	17610as	1530-1545		Greece, Voice of	6155eu	11780as
1500-1600	New Zealand, R NZ Intl	9510as				1530-1600		India, All India Radio	15630na	15650na
1500-1600	Nigeria, Radio	4990do	7285do			1530-1600			17525na	
1500-1600	Nigeria, Voice of	7255af				1530-1600 mtwhf		Portugal, Radio	3945do	6140do
1500-1550	North Korea, R Pyongyang	9325eu	9640af	9977af	13785eu	1530-1600		Sudan, National BC Corp	9540do	9550do
1500-1600	Philippines, FEBC Manila	11995as				1530-1600		United Kingdom, BBC London	7180as	9515va
1500-1600	Russia, Radio Moscow	6065na	7170na	7260na	7330va				9750na	11750as
		7345na	7370va	7380na	9745va				12095eu	15070va
		9755na	9780va	9855va	9890va				15260as	15420va
		12065va	15465va	15480va	15540va	1545-1600			17840na	17860va
		15550va	21610va	21755va				Vatican State, Vatican R	15090au	17865as

## SELECTED PROGRAMS

## Sundays

1505 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 1515 BBC: Concert Hall. Classical music from the world's great concert halls (except 7th: International Recital, live concerts from the BBC concert hall).  
 1515 China Radio Int'l: Sports Beat. See S 1215.  
 1520 China Radio Int'l: China Anthology. See S 1220.  
 1528 China Radio Int'l: Music Album. See S 1228.  
 1535 Radio Netherlands: Happy Station. See S 0135.  
 1540 China Radio Int'l: Listeners' Letterbox. See S 1240.

## Mondays

1505 Radio Netherlands: CDutch. See M 1305.  
 1506 Christian Science Monitor: Encore. See M 0106.  
 1515 BBC: Feature/Drama. See M 0101.  
 1515 China Radio Int'l: The Business Show or China's Open Windows. See M 1215.  
 1525 Radio Netherlands: Press Review. See S 1225.  
 1534 Christian Science Monitor: Letterbox. See M 0134.  
 1535 Radio Netherlands: Newsline. See S 0035.  
 1540 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 1547 Christian Science Monitor: Religious Article. See M 0147.  
 1550 Radio Netherlands: Research File. See M 1150.

## Tuesdays

1506 Christian Science Monitor: Home Forum. See M 2306.  
 1515 BBC: A Jolly Good Show. Dave Lee Travis presents listener rock music requests.

1515 China Radio Int'l: Current Affairs. See T 1215.  
 1525 Radio Netherlands: Press Review. See M 1225.

1534 Christian Science Monitor: Letterbox. See M 0134.

1535 Radio Netherlands: Newsline. See S 0035.

1540 China Radio Int'l: Listeners' Letterbox. See S 1240.

1547 Christian Science Monitor: Religious Article. See M 0147.

1550 Radio Netherlands: No Boundaries. See T 0150.

## Wednesdays

1506 Christian Science Monitor: Curtain Call. See T 2306.  
 1515 BBC: Talks. See M 0415.  
 1515 China Radio Int'l: Current Affairs. See T 1215.  
 1525 Radio Netherlands: Press Review. See M 1225.  
 1530 BBC: Comedy/Quiz. This month, Richard Murdoch and Kenneth Horns star in the comedy classic "Much Binding In The Marsh" (except 31st: Two Cheers For March, a humorous look at the month just past).  
 1534 Christian Science Monitor: Letterbox. See M 0134.  
 1535 Radio Netherlands: Newsline. See S 0035.  
 1540 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 1547 Christian Science Monitor: Religious Article. See M 0147.  
 1550 Radio Netherlands: Feature Documentary. See W 1150.

## Thursdays

1506 Christian Science Monitor: Kaleidoscope. See W 2306.  
 1515 BBC: Classics With Kay. See S 2315.  
 1515 China Radio Int'l: Current Affairs. See T 1215.  
 1525 Radio Netherlands: Press Review. See M 1225.  
 1534 Christian Science Monitor: Letterbox. See M 0134.

1535 Radio Netherlands: Newsline. See S 0035.

1540 China Radio Int'l: Culture In China. See H 1240.

1547 Christian Science Monitor: Religious Article. See M 0147.

1550 Radio Netherlands: Media Network. See H 0150.

## Fridays

1506 Christian Science Monitor: Arts Forum or Sportsworld. See H 2306.  
 1515 BBC: Music Review. See H 2315.  
 1515 China Radio Int'l: Current Affairs. See T 1215.  
 1525 Radio Netherlands: Press Review. See M 1225.  
 1534 Christian Science Monitor: Letterbox. See M 0134.  
 1535 Radio Netherlands: Newsline. See S 0035.  
 1540 China Radio Int'l: In The Third World. See F 1240.  
 1547 Christian Science Monitor: Religious Article. See M 0147.  
 1550 Radio Netherlands: Toward 2000. See F 1150.

## Saturdays

1505 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 1515 BBC: Sportsworld. See A 1430.  
 1515 China Radio Int'l: Press Clippings. See S 0015.  
 1520 China Radio Int'l: Travel Talk. See S 0020.  
 1525 Radio Netherlands: Press Review. See M 1225.  
 1528 China Radio Int'l: Cooking Show. See S 0028.  
 1535 China Radio Int'l: Music From China. See S 0035.  
 1550 Radio Netherlands: Sounds Interesting. See S 0050.

1600 UTC

[11:00 AM EST/8:00 AM PST]

## FREQUENCIES

1600-1700	Australia, Radio	5995pa	6060pa	9510pa	9580pa	1600-1700	Saudi Arabia, BSKSA	9705eu	9720eu
1600-1700	Canada, CFCX Montreal	11800pa	11855pa	11880pa	13755as	1600-1605	Singapore, SBC1	5010do	5052do
1600-1700	Canada, CFRX Toronto	6005do				1600-1700	South Korea, Radio Korea	5975om	9870af
1600-1700	Canada, CFVP Calgary	6070do				1600-1700	Sri Lanka, SLBC Colombo	6075as	9720as
1600-1700	Canada, CHNX Halifax	6030do				1600-1630	Sweden, Radio	15270me	17870na
1600-1700	Canada, CKZU Vancouver	6130do				1600-1645	UAE, UAE Radio Dubai	11795af	13675eu
1600-1700	Canada, CKZU Vancouver	6160do				1600-1630	United Kingdom, BBC London	7215na	9740me
1600-1700	China, China Radio Intl	11575af	15110af	15130af				15260na	15310va
1600-1700	Costa Rica, RFPI Santa Ana	7375na	13630na	15030na				17860va	17880af
1600-1700	Ecuador, HCJB Quito	17790me	21455am	21480me		1600-1700 as	USA, CSMonitor Boston MA	11580as	13625as
1600-1700	France, Radio France Intl	11705af	12015af	15530me	17620af	1600-1700	USA, CSMonitor Boston MA	13710na	17510na
1600-1650	Germany, Deutsche Welle	7225as	7305as	9585as	11785as	1600-1700	USA, KTBN Salt Lk City UT	15590am	
		15105as	15595as			1600-1700	USA, VOA Washington DC	9575af	11920af
1600-1700	Ghana, GBC Radio 1	4915do						11995af	15225af
1600-1700	Ghana, GBC Radio 2	7295do						15445af	15495af
1600-1700	Guam, KSDA	11980as				1600-1700	USA, WHRI Noblesville IN	9465am	15105am
1600-1645	Guam, KTWR	15610as				1600-1700	USA, WJCR Upton KY	7490na	13595na
1600-1700	Iraq, Radio Iraq Intl	13680as				1600-1700	USA, WWCR Nashville TN	13845am	15685va
1600-1625	Netherlands, Radio	9895as	13770as	15150as	17610as	1600-1700	USA, WYFR Okeechobee FL	11830am	15215na
1600-1649	New Zealand, R NZ Intl	9510as						15355am	17760eu
1600-1700	Nigeria, Radio	4990do				1600-1640	Vatican State, Vatican R	15090au	17865au
1600-1700	Nigeria, Voice of	7255af				1600-1630	Vietnam, Voice of	12020eu	15010eu
1600-1630 as	Norway, Radio Norway Intl	11875as	15230af			1630-1657	Canada, RCI Montreal	7150as	9555as
1600-1630	Pakistan, Radio	11570me	13685af	15555af	17555	1630-1700	Ecuador, HCJB Quito	17790me	21455me
1600-1655	Poland, Polish R Warsaw	7285eu	9525eu	11840eu		1630-1700	Egypt, Radio Cairo	15255af	
1600-1700	Russia, Radio Moscow	7170va	7250va	7260na	7345va	1630-1700 mtwhf	Portugal, Radio	21515me	
		9540va	9590va	9660va	9705va		United Kingdom, BBC London	6195va	9515na
		9715va	9755na	9860va	9890va			9630va	9740me
		9895va	11655va	11840va	15465va	1630-1700	USA, VOA Washington DC	6180eu	12095eu
		15480va	15540va	15550va	21755va	1645-1700 s	Guam, KTWR	15070eu	15260na
1600-1700	S Africa, Channel Africa	15430af				1650-1700 smtwhf	New Zealand, R NZ Intl	15610as	15310va
1600-1640 vl	S Africa, Radio Oranje	9630do						15420va	17880af
								21470af	21660af
								11855me	

## SELECTED PROGRAMS

## Sundays

1605 Christian Science Monitor: The Sunday Service. A religious service from the First Church of Christ, Scientist, in Boston.  
 1615 BBC: Feature. See S 0230.  
 1615 China Radio Int'l: Sports Beat. See S 1215.  
 1620 China Radio Int'l: China Anthology. See S 1220.  
 1628 China Radio Int'l: Music Album. See S 1228.  
 1640 China Radio Int'l: Listeners' Letterbox. See S 1240.  
 1645 BBC: Letter From America. See S 0615.

## Mondays

1606 Christian Science Monitor: News Features And Interviews. See M 0006.  
 1615 BBC: New Ideas. A look at the latest technology, innovations, and new products.  
 1615 China Radio Int'l: The Business Show or China's Open Windows. See M 1215.  
 1635 BBC: Talks. This month: Wole Soyinka features in "Writers In A Nutshell" (1st); Michael Diamond looks at the influence of Indian languages in "From India To English" (8th, 15th, 22nd, 29th).  
 1640 China Radio Int'l: Learn To Speak Chinese. See M 1240.  
 1645 BBC: The World Today. A look at a topical aspect of the international scene.

## Tuesdays

1606 Christian Science Monitor: News Features And Interviews. See M 0006.  
 1615 BBC: Megamix. See T 1130.  
 1615 China Radio Int'l: Current Affairs. See T 1215.  
 1640 China Radio Int'l: Listeners' Letterbox. See S 1240.  
 1645 BBC: The World Today. See M 1645.

## Wednesdays

1606 Christian Science Monitor: News Features And Interviews. See M 0006.

1615 BBC: Rock/Pop Music. See T 0630.

1615 China Radio Int'l: Current Affairs. See T 1215.

1640 China Radio Int'l: Learn To Speak Chinese. See M 1240.

1645 BBC: The World Today. See M 1645.

## Thursdays

1606 Christian Science Monitor: News Features And Interviews. See M 0006.  
 1615 BBC: Network UK. Issues and events affecting people across the UK.  
 1615 China Radio Int'l: Current Affairs. See T 1215.  
 1640 China Radio Int'l: Culture In China. See H 1240.  
 1645 BBC: The World Today. See M 1645.

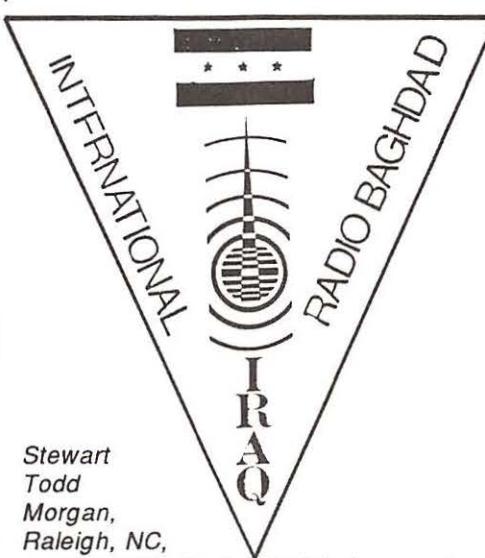
## Fridays

1606 Christian Science Monitor: News Features And Interviews. See M 0006.  
 1615 BBC: Science In Action. The latest in science and technology.  
 1615 China Radio Int'l: Current Affairs. See T 1215.  
 1640 China Radio Int'l: In The Third World. See F 1240.  
 1645 BBC: The World Today. See M 1645.

## Saturdays

1605 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 1615 BBC: Sportsworld. See A 1430.  
 1615 China Radio Int'l: Press Clippings. See S 0015.  
 1620 China Radio Int'l: Travel Talk. See S 0020.  
 1628 China Radio Int'l: Cooking Show. See S 0028.  
 1635 China Radio Int'l: Music From China. See S 0035.

Stewart  
 Todd  
 Morgan,  
 Raleigh, NC,  
 received this Radio Baghdad pennant.  
 Check the February '93 issue of MT for  
 an update on Persian Gulf monitoring!



## 1700 UTC [12:00 PM EST/9:00 AM PDT]

1700-1800	Algeria, Radio Algiers	9535me	17745af			1800-1900	Canada, CHNX Halifax	6130do			
1700-1800	Australia, Radio	5995pa	6060pa	6080pa	7240pa	1800-1900	Canada, CKZU Vancouver	6160do			
		7260pa	9580pa	11880pa	11910pa	1800-1830	Canada, RCI Montreal	13670af	15260af	17820af	
		13755as				1800-1900	Costa Rica, RFPI Santa Ana	7375am	13630am	15030am	
1700-1800	Azerbaijan, Azerbaijani R	6175as				1800-1827	Czechoslovakia, Radio	5930eu	6055eu	7345eu	9605eu
1700-1800	Canada, CFCX Montreal	6005do				1800-1900	Ecuador, HCJB Quito	17790eu	21455am	21480eu	
1700-1800	Canada, CFRX Toronto	6070do				1800-1830	Egypt, Radio Cairo	15255af			
1700-1800	Canada, CFVP Calgary	6030do				1800-1900	Ghana, GBC Radio 1	4915do			
1700-1800	Canada, CHNX Halifax	6130do				1800-1900	Ghana, GBC Radio 2	7295do			
1700-1800	Canada, CKZU Vancouver	6160do				1800-1900	Guam, KSDA	13720af			
1700-1730 mtwhf	Canada, RCI Montreal	5995eu	7235eu	13650eu	15325eu	1800-1900	India, All India Radio	7412me	9950me	11620eu	11860af
		17820eu	21545eu					11935af	15080as		
1700-1800	China, China Radio Intl	9570as	11575as	15345as		1800-1815	Israel, Kol Israel	7465na	11587eu	11675na	17575af
1700-1800	Costa Rica, RFPI Santa Ana	7375na	13630na	15030na		1800-1900 irreg	Italy, IRRS Milan	7125eu			
1700-1800	Ecuador, HCJB Quito	15270me	17790me	21455me	21480na	1800-1900	Kuwait, Radio	13620na			
1700-1800	Egypt, Radio Cairo	15255af				1800-1825	Netherlands, Radio	6020af	9605af	21515af	21590af
1700-1800	Ghana, GBC Radio 1	4915do				1800-1850 mtwhf	New Zealand, R NZ Intl	9675pa			
1700-1800 as	Guam, KSDA	13720af				1800-1855	Poland, Polish R Warsaw	7270eu	9525eu		
1700-1800 irreg	Italy, IRRS Milan	7125eu				1800-1900	Russia, Radio Moscow	7260va	9685as	9785va	9860va
1700-1800	Japan, Radio	7140as	9535na	11815af	17775af			9890va	11770va	11840va	12050va
1700-1800 smtwhf	New Zealand, R NZ Intl	9675pa						13670va	15425va	15485va	17605va
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9977af	11705eu	1800-1900	Saudi Arabia, BSKSA	9705eu	9720eu		
1700-1730 as	Norway, Radio Norway Intl	9655eu				1800-1900	South Korea, Radio Korea	15575eu			
1700-1750	Pakistan, Radio	9420eu	11570eu			1800-1830	United Kingdom, BBC London	5975va	9410eu	15070eu	15310va
1700-1800	Russia, Radio Moscow	7170as	7260as	7345as	7370as			15400af	15420af	17880af	
		9540va	9685va	9705va	9755va	1800-1900	USA, CSMonitor Boston MA	9535pa	13840na	15565eu	15665eu
		9860va	9890va	12060va				21640af			
1700-1800	S Africa, Channel Africa	11900af	15430af			1800-1900 sa	USA, CSMonitor Boston MA	17555am			
1700-1800	Saudi Arabia, BSKSA	9705eu	9720eu			1800-1900	USA, KCBI Dallas TX	15375va			
1700-1730	Sri Lanka, SLBC Colombo	6075as	9720as			1800-1900 irreg	USA, KJES Albuquerque NM	9510na			
1700-1730	Switzerland, Swiss R Intl	3985eu	6165eu	9535eu		1800-1900	USA, KTBN Salt Lk City UT	15590am			
1700-1715	Switzerland, Swiss R Intl	9885af	13635af	15430af	17635af	1800-1900	USA, VOA Washington DC	6040eu	9575af	9700eu	9760me
1700-1730	United Kingdom, BBC London	5975na	6190na	9410va	9515na			11920af	11995af	13710af	15205me
		12095eu	15070eu	15260na	15310va			15410af	15445af	15580af	17650af
		15400af	15420af	17880af				17800af	21625af		
1700-1800	USA, CSMonitor Boston MA	11580as	13625as	17510na	21640af	1800-1900	USA, WHRI Noblesville IN	13760na	17835sa		
1700-1800 sa	USA, CSMonitor Boston MA	13710na	17555am			1800-1900	USA, WINB Red Lion PA	15295eu			
1700-1800	USA, KCBI Dallas TX	15375va				1800-1900	USA, WJCR Upton KY	7490na	13595na		
1700-1800	USA, KTBN Salt Lk City UT	15590am				1800-1900	USA, WMLK Bethel PA	9465eu			
1700-1800	USA, VOA Washington DC	6040me	6110as	7125as	9645as	1800-1900	USA, WWCR Nashville TN	13845am	15685na		
		9700va	9760me	11920af	11995af	1800-1900	USA, WYFR Okeechobee FL	21500va			
		13710af	15205me	15320af	15395as	1800-1830	Vietnam, Voice of	9840eu	12020eu	15010eu	
		15445af	19261am			1815-1900	Bangladesh, Radio	9570me	12030eu		
1700-1800	USA, WHRI Noblesville IN	13760am	15105am			1830-1900	Bulgaria, Radio Sofia	6235eu	9560eu	9700na	11720na
1700-1800	USA, WJCR Upton KY	7490na	13595na			1830-1900 as	Canada, RCI Montreal	13670me	15260me	17820me	
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu				1830-1900	Netherlands, Radio	6020af	9605af	21515af	21590af
1700-1800	USA, WWCR Nashville TN	13845va	15685va			1830-1900	Sri Lanka, SLBC Colombo	9720eu	15120eu		
1700-1800	USA, WYFR Okeechobee FL	21500va				1830-1900	United Kingdom, BBC London	3255va	6190va	6195va	9410eu
1715-1745	United Kingdom, BBC London	9515ca	9560ca	15260ca	21660ca			15070eu	15400af	17880va	
1715-1730	Vatican State, Vatican R	6245eu	7250af	9645me				15630af	17525af		
1730-1800	Netherlands, Radio	6020af	9605af	21515af	21590af			15120pa			
1730-1800	Romania, R Romania Intl	15340af	15365af	17720af	17745af						
1730-1800	United Kingdom, BBC London	9595va	5975va	6010va	9515na						
		9740me	15260na	15310va	15400va						
		17780va									
1730-1800	Vatican State, Vatican R	11625af	15090af	17730af							
1745-1800	India, All India Radio	7412me	9950eu	11620eu	11860af						

## 1800 UTC [1:00 PM EST/10:00 AM PDT]

1800-1900 twhfs	Argentina, RAE Buenos Aires	15345eu			
1800-1900	Australia, Radio	5995pa	6010pa	6060pa	6080pa
		7240pa	9580pa	11880pa	11910pa
		12000pa			
1800-1900	Brazil, Radiobras	15265eu			
1800-1900	Canada, CFCX Montreal	6005do			
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			

## 1900 UTC [2:00 PM EST/11:00 AM PST]

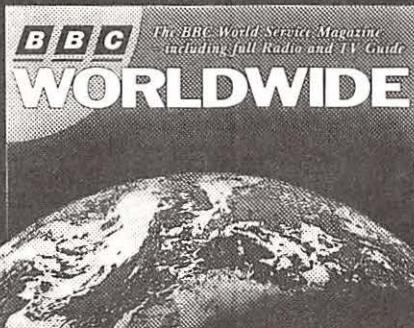
1900-2000	Australia, Radio	5995pa	6060pa	6080pa	7240pa
		7260pa	9580pa	11720pa	11855pa
		11910pa			
1900-1930	Belgium, R Vlaanderen	5900af			
1900-2000	Bulgaria, Radio Sofia	15330na			
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-1930	Canada, RCI Montreal	13670af	15260af	17820af	
1900-2000	China, China Radio Intl	6955af	9440af		
1900-2000	Costa Rica, RFPI Santa Ana	7375am	13630am	15030am	
1900-2000	Ecuador, HCJB Quito	17790eu	21455eu	21480eu	

## 1900 UTC continued

1900-1950	Germany, Deutsche Welle	9765af	11765af	11785af	11905af
1900-2000	India, All India Radio	13790af	15350af	17810af	
1900-1930	Japan, Radio	7412me	9950eu	11620eu	11860af
1900-2000	Kuwait, Radio	9535am	9640va	11850va	
1900-1930 s	Lebanon, King of Hope	13620na			
1900-2000 s	Morocco, RTV Marocaine	6280me			
1900-1925	Netherlands, Radio	11920as			
1900-2000	Nigeria, Radio	6020af	9605af	21515af	21590af
1900-2000	Nigeria, Voice of	3326do	4990do		
1900-2000 as	Norway, Radio Norway Intl	7255af			
1900-1930 as	Romania, R Romania Intl	15220va	17730va		
1900-2000	Russia, Radio Moscow	6105eu	7195eu	7225eu	
1900-2000	Saudi Arabia, BSKSA	7170va	7260va	9685va	9725va
1900-2000	Spain, Spanish Natl Radio	9720eu	15120eu		
1900-1930	Sri Lanka, SLBC Colombo	7160va	9410eu	12095eu	
1900-2000	United Kingdom, BBC London	6005va	15070eu	15400af	17880va
1900-2000	USA, CSMonitor Boston MA	9425pa	13840ra	15665eu	21640af
1900-2000 sa	USA, CSMonitor Boston MA	17555am			
1900-2000	USA, KCBI Dallas TX	15375va			
1900-2000	USA, KTBN Salt LK City UT	15590am			
1900-2000	USA, VOA Washington DC	3990af	9525as	9700eu	13710af
		15320af	15410af	15580eu	17800af
		19261am			

1900-2000	USA, WHRI Noblesville IN	13760na	17835na
1900-2000	USA, WINB Red Lion PA	15295eu	
1900-2000	USA, WJCR Upton KY	7490na	13595na
1900-2000	USA, WMLK Bethel PA	9465eu	
1900-2000	USA, WWCR Nashville TN	13845na	15685va
1900-2000	USA, WYFR Okeechobee FL	15355eu	21615af
1900-1930	Vietnam, Voice of	9840eu	12020eu
1930-2000	Austria, R Austria Intl	5945eu	6155eu
1930-2000	Bulgaria, Radio Sofia	15330na	
1930-1955	Finland, Radio	6120eu	9730eu
1930-2000	Iran, VOIRI Tehran	9022va	15260va
1930-2000 fa	Kazakhstan, R Alma Ata	3955do	5035do
		5970eu	7115eu
		11825eu	15215eu
		15285eu	15315eu
		17605eu	17730eu
1930-2000	Netherlands, Radio	17605af	21590af
1930-2000	Poland, Polish R Warsaw	7145eu	9525eu
1930-2000	United Kingdom, BBC London	6190va	9410eu
		6195va	7160va
1930-2000	Yugoslavia, Radio	9410va	9630va
1935-1955	Italy, RAI Rome	6100eu	7200af
1940-2000 smwha	Mongolia, R Ulaanbaatar	7275eu	9710eu
1950-2000	Vatican State, Vatican R	11790eu	11850eu

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2000 UTC [3:00 PM EST/12:00 PM PST] 2100 UTC [4:00 PM EST/1:00 PM PST]

2000-2100	Australia, Radio	5995pa 9580pa	6060pa 9860pa	6080pa 11720as	7240pa 11910pa	2100-2200	Australia, Radio	5995pa 11880pa	6060pa 13705pa	6080pa 15365as	11720pa 9560na
2000-2100	Canada, CFCX Montreal	6005do			12000pa	2100-2115	Bulgaria, Radio Sofia	6235eu			
2000-2100	Canada, CFRX Toronto	6070do				2100-2200	Canada, CFCX Montreal	6005do			
2000-2100	Canada, CFVP Calgary	6030do				2100-2200	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CHNX Halifax	6130do				2100-2200	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CKZU Vancouver	6160do				2100-2200	Canada, CHNX Halifax	6130do			
2000-2100	Canada, RCI Montreal	11945eu 17820eu	13650eu 17875eu	13670eu	15325eu	2100-2130	Canada, CKZU Vancouver	6160do			
2000-2100	China, China Radio Intl	9440af	9920eu	11500eu	11715af	2100-2200	China, China Radio Intl	9920eu	11715af	15110af	
2000-2100	Ecuador, HCJB Quito	17790eu	21455am	21480eu		2100-2200	Costa Rica, RPI Santa Ana	7375na	13630na	15030na	
2000-2100	Ghana, GBC Radio 1	4915do				2100-2200	Cuba, Radio Havana Cuba	15165na	17705eu		
2000-2100	Ghana, GBC Radio 2	7295do				2100-2150	Czechoslovakia, Radio	5960eu	7345eu	9605eu	
2000-2015	Greece, Voice of	7450eu	9395eu			2100-2200	Egypt, Radio Cairo	15375af			
2000-2030	Israel, Kol Israel	7465na 11675na	9435na 17575af	11587eu	11603am	2100-2200	Germany, Deutsche Welle	6185as	9670as	9690as	9765as
2000-2010 mtwhfa	Kenya, Voice of	4935do				2100-2200	Ghana, GBC Radio 1	4915do			
2000-2100	Kuwait, Radio	13620na				2100-2200	Ghana, GBC Radio 2	7295do			
2000-2100	Lebanon, King of Hope	6280me				2100-2200	Hungary, Radio Budapest	6110eu	9835eu	11910eu	
2000-2010 smwha	Mongolia, R Ulaanbaatar	11850eu	12015eu			2100-2200	Japan, Radio	11815me	11925va	15430eu	17810as
2000-2025	Netherlands, Radio	17605af	21590af			2100-2130	Lebanon, King of Hope	6280me			
2000-2100	Nigeria, Radio	3326do	4990do			2100-2200	Neth Antilles, TWR Bonaire	11930am			
2000-2030	Nigeria, Voice of	7255af				2100-2130 as	Nigeria, Radio	3326do	4990do		
2000-2050	North Korea, R Pyongyang	6576eu	9345eu	9640af	9977af	2100-2130 mtwhf	Norway, Radio Norway Intl	15180va			
2000-2025	Poland, Polish R Warsaw	7145eu	9525eu			2100-2200	Portugal, Radio	15250af			
2000-2030 mtwhf	Portugal, Radio	11740eu				2100-2200	Romania, R Romania Intl	5955eu	6105eu	7195eu	7225eu
2000-2100	Russia, Radio Galaxy	11880eu				2100-2200	Russia, Radio Moscow	4795va	4825va	7115va	7150va
2000-2100	Russia, Radio Moscow	4795va 7205va 9870va	4825va 9685va 9890va	7170va 9725va 9785va	17605na	2100-2200	Russia, Radio Moscow	7180va	7205va	9725va	9750va
		21480va				2100-2130	South Korea, Radio Korea	6480af	7550me	15575eu	
2000-2100	Saudi Arabia, BSKSA	9705eu	9720eu			2100-2200	Spain, Spanish Natl Radio	6130eu			
2000-2030	Switzerland, Swiss R Intl	9885af	12035af	13635af	15505af	2100-2200	Sri Lanka, SLBC Colombo	15120as			
2000-2030	United Kingdom, BBC London	9410eu 13650eu	11945eu 15070eu	11955va 15260sa	12095eu 15325eu	2100-2130	Sweden, Radio	6065va	9655va	17730as	
		17875eu	17880af			2100-2105	Syria, Radio Damascus	12085na	15095na		
2000-2100	USA, CSMonitor Boston MA	7510eu	9455as	13625pa	13770am	2100-2200	Turkey, Voice of	9445eu			
		17510am	17555sa			2100-2200	Ukraine, R Ukraine Intl	5960eu	7250eu	7340eu	9600eu
2000-2100	USA, KCBI Dallas TX	15375va				2100-2130	United Kingdom, BBC London	6005va	6180va	7180as	9410eu
2000-2100	USA, KTBN Salt Lk City UT	15590am				2100-2200	USA, CSMonitor Boston MA	9455as	13625pa	13770na	15665eu
2000-2100	USA, VOA Washington DC	6040eu 13710af 15445af 17800af 21625af	9700eu 15160eu 15495af 19261eu	9760eu 15205eu 15580af 21485af	11710eu 15410af 17650af 21485af	2100-2200	USA, KCBI Dallas TX	15375va			
		21615na				2100-2200	USA, KTBN Salt Lk City UT	15590na			
						2100-2200	USA, VOA Washington DC	13710va	15290af	15410af	15495af
2000-2100	USA, WHRI Noblesville IN	13760af	17835va			2100-2200	USA, WHRI Noblesville IN	13760am	17835na		
2000-2100	USA, WJCR Upton KY	7490na	13595na			2100-2200	USA, WINB Red Lion PA	15185eu			
2000-2100	USA, WMLK Bethel PA	9465eu				2100-2200	USA, WJCR Upton KY	7490na	13595va		
2000-2100	USA, WRNO New Orleans LA	15420na				2100-2200	USA, WMLK Bethel PA	9465eu			
2000-2100	USA, WWCR Nashville TN	13845va	15685va			2100-2200	USA, WRNO New Orleans LA	15420na			
2000-2100	USA, WYFR Okeechobee FL	17355eu	15355na	15566eu	15585eu	2100-2200	USA, WWCR Nashville TN	13845va	15685va		
		17610na	17750af	21252eu	21615na	2100-2200	USA, WYFR Okeechobee FL	17355eu	15566eu	17750af	21525eu
2000-2030	Vatican State, Vatican R	9645af	11625af	15090af		2100-2110	Vatican State, Vatican R	5885eu	7250eu		
2005-2100	Syria, Radio Damascus	12085na	15095na			2110-2200	Syria, Radio Damascus	12085na	15095na		
2010-2100 sa	Kenya, Voice of	4935do				2115-2200	Egypt, Radio Cairo	9900eu			
2025-2045	Italy, RAI Rome	7235me	9575me	11800me		2115-2130 mtwhf	United Kingdom, BBC Carib	15390ca	17715ca		
2030-2100	Canada, RCI Montreal	5995eu	7230eu	11945eu	13650eu	2125-2200	Belgium, R Vlaanderen	5910eu	9905eu		
		15140eu	15325eu	17875eu		2130-2200	Austria, R Austria Intl	5945eu	6155eu	9870af	
2030-2100	Egypt, Radio Cairo	15375af				2130-2200	Canada, RCI Montreal	11880af	15150af	17820af	
2030-2035	Latvia, Radio Riga	5935do				2130-2200	Ecuador, HCJB Quito	17790eu	21455eu	21480eu	
2030-2100	South Korea, Radio Korea	6480af	7550me	15575eu		2130-2200	Kazakhstan, R Alma Ata	3955do	5035do	5260do	5960eu
2030-2100	United Kingdom, BBC London	9410eu	12095eu	15260sa	15400af	2130-2200		5970eu	7115eu	9505eu	9690eu
		15495as	15580as			2130-2200		11825eu	15215eu	15250eu	15270eu
2030-2100	USA, WHRI Noblesville IN	17835va				2130-2200		15285eu	15315eu	15360eu	15385eu
2030-2100	Vietnam, Voice of	9840eu	12020eu	15010eu		2130-2200 smtwhf	Lebanon, King of Hope	6280me			
2045-2100	Bulgaria, Radio Sofia	6235eu				2130-2200	Lithuania, Radio Vilnius	9530na	17605na	17690na	
2055-2100	Neth Antilles, TWR Bonaire	11930am				2130-2200	New Zealand, R NZ Intl	17770pa			

**2100 UTC** continued

2130-2200	Sweden, Radio	6065eu	9655pa	11955as	
2130-2200	United Kingdom, BBC Flk Is	13660sa			
2130-2200	United Kingdom, BBC London	5975ca	6125eu	6180va	6195eu
		7125va	9410eu	9590na	15260sa
		15340va	15400va		

**2200 UTC** [5:00 PM EST/2:00 PM PST]

2200-2230	Albania, R Tirana Intl	9760eu	11825eu		
2200-2300	Australia, Radio	9645as	11720pa	11880pa	13705as
		15240pa	15320pa	15365as	17795pa
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2300	Canada, RCI Montreal	9760eu	11945eu		
2200-2230	China, China Radio Intl	3985eu	7170eu		
2200-2300	Costa Rica, RFPI Santa Ana	13630ca	15030ca		
2200-2300	Cuba, Radio Havana Cuba	6180va			
2200-2230	Czechoslovakia, Radio	5930eu	6055eu	7345eu	9605eu
2200-2300	Ecuador, HCJB Quito	17790eu	21455am	21480eu	
2200-2300	Ghana, GBC Radio 1	4915do			
2200-2300	Ghana, GBC Radio 2	7295do			
2200-2230	India, All India Radio	7412eu	9910eu	9950eu	11620eu
		11715eu	15265eu		
2200-2300	Iraq, Radio Iraq Intl	15210eu			
2200-2225	Italy, RAI Rome	5990as	9710as	11800as	
2200-2300 smtwha	Malaysia, RTM Radio 4	7295do			
2200-2300	New Zealand, R NZ Intl	17770pa			
2200-2300	Nigeria, Radio	3326do	4990do		
2200-2300	Russia, Radio Moscow	7115va	7170va	7180va	7300va
		9520va	9685va	9715va	9725va
		9735va	9750va	9785va	9795va
		9860va	9870va	9890va	12050va
		15425na	17570va	17605va	17655va
2200-2300	Russia, Radio Moscow	17690va	21480va		
2200-2300	Sierra Leone, SLBS	3316do			
2200-2300	Singapore, SBC1	5010do	5052do	11940do	
2200-2230	Switzerland, Swiss R Intl	9810sa	9885sa	12035sa	15570sa
2200-2210	Syria, Radio Damascus	12085na	15095na		
2200-2300	Taiwan, VO Free China	9850eu	11915eu		
2200-2300	Turkey, Voice of	9445na			
2200-2300	UAE, Radio Abu Dhabi	9605na	11710na	11815na	
2200-2300	Ukraine, R Ukraine Intl	4795eu	6010eu	6020eu	7195eu
		7240eu	9710eu		
2200-2300	United Kingdom, BBC London	5975na	6195as	7325am	9590na
		11750sa	15260sa	15340af	15400af
		17325am	17830as		
2200-2300	USA, CSMonitor Boston MA	7510va	9465na	13625as	15405as
		15665eu	17555am		
2200-2300	USA, KCBI Dallas TX	15725va			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2230	USA, VOA Washington DC	6030sa	7120as	9770as	11760as
		15185as	15290as	15305as	17735as
		17820as			
2200-2300	USA, VOA Washington DC	7120as	9770as	11760as	15185au
		15290au	15305au	17735au	17820au
2200-2300	USA, WHRI Noblesville IN	13760na			
2200-2245	USA, WINB Red Lion PA	15185eu	15195eu		
2200-2300	USA, WJCR Upton KY	7490na	13595na		
2200-2300	USA, WRNO New Orleans LA		15420na		

2200-2300	USA, WWCR Nashville TN	13845na	15685na	
2200-2300	USA, WYFR Okeechobee FL	17610na	17750eu	21252eu
2200-2230 s	USA, KGEI San Francisco CA	15280sa		
2200-2229	Yugoslavia, Radio	6100eu	7200eu	9505na
2203-2209	Croatia, Croatian Radio	6210eu	9830eu	13830eu
2215-2245	Egypt, Radio Cairo	9900eu		
2215-2300	Finland, Radio	9730eu	11740eu	11810eu
2230-2300 mtwhf	Congo, RTV Congolaise	4765do		
2230-2300	Israel, Kol Israel	7465eu	9435na	11567na
		11675eu	17575eu	11603eu
2230-2300	Lithuania, Radio Vilnius	9710eu		
2230-2300	Sweden, Radio	9655eu	11955as	
2230-2300	USA, VOA Washington DC	9530eu	11905me	11960me
2235-2300 irreg	USA, WEWN Birmingham AL	7540na		17885me
2240-2250 smtwhf	Greece, Voice of	11645au		
2245-2300	Armenia, Radio Yerevan	7440eu	11980eu	12060eu
2245-2300	Bulgaria, Radio Sofia	9700na	11720na	
2245-2300	India, All India Radio	9910as	11745as	15110as
		17830as		15145as
2245-2300	USA, WINB Red Lion PA	15145eu		
2245-2300	Vatican State, Vatican R	9600au	11830au	15090au
2255-2300	Neth Antilles, TWR Bonaire	11930am		

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### Month

### Year

2300 UTC

[6:00 PM EST/3:00 PM PST]

## FREQUENCIES

2300-0000	Australia, Radio	11720pa	11880pa	15240pa	15320pa	2300-2350	Turkey, Voice of	7185me	9445na	11895eu
2300-2315	Bulgaria, Radio Sofia	15365as	17795pa			2300-0000	UAE, Radio Abu Dhabi	9605na	11710na	11815na
2300-0000	Canada, CFCX Montreal	6005do				2300-2330	United Kingdom, BBC London	5975na	6175na	6195as
2300-0000	Canada, CFRX Toronto	6070do						7325as	9410va	9590va
2300-0000	Canada, CFVP Calgary	6030do				2300-0000	USA, CSMonitor Boston MA	7510af	9465na	13625as
2300-0000	Canada, CHNX Halifax	6130do						15405af	15665eu	17555af
2300-0000	Canada, CKZU Vancouver	6160do				2300-0000	USA, KCBI Dallas TX	15725va		
2300-2330 as	Canada, RCI Montreal	11940sa	15235sa			2300-0000	USA, KTBN Salt Lk City UT	15590na		
2300-2330	Canada, RCI Montreal	9535na	9755na	11730na	11940na	2300-2400	USA, KVOH Los Angeles CA	9725am		
2300-0000	Costa Rica, AWR Alajuela	9725ca	11870ca			2300-0000	USA, VOA Washington DC	7120as	9530me	9770as
2300-0000	Costa Rica, RFPI Santa Ana	7375na	7385na	13630na	15030na			11905me	11960eu	15185au
2300-0000	Ecuador, HCJB Quito	17790eu	21455am	21480eu		2300-2315 irreg	USA, WEWN Birmingham AL	7540na		
2300-2345	Finland, Radio	9730eu	11740eu	11810eu		2300-0000	USA, WHRI Noblesville IN	13760sa		
2300-2305	Ghana, GBC Radio 1	4915do				2300-0000	USA, WINB Red Lion PA	15145eu		
2300-2305	Ghana, GBC Radio 2	7295do				2300-0000	USA, WJCR Upton KY	7490na	13595na	
2300-0000	Guam, KSDA	15610as				2300-0000	USA, WRNO New Orleans LA	7355na		
2300-0000	India, All India Radio	9910as	11715as	11745as	15110as	2300-0000	USA, WWCR Nashville TN	13845na	15685va	
		15145as	17830as			2300-0000	Australia, Radio	17795pa	21740pa	
2300-0000	Japan, Radio	11815am	15195as	15430as	17810pa	2330-0000	Austria, R Austria Intl	9870sa	13730sa	
2300-0000 smtwha	Malaysia, RTM Radio 4	7295do				2330-0000 as	Canada, RCI Montreal	11940sa	15235sa	
2300-0000	Neth Antilles, TWR Bonaire	11930am				2330-0000	Canada, RCI Montreal	9755am	11730am	13670am
2300-0000	New Zealand, R NZ Intl	17770pa				2330-0000 a	Colombia, Radio Nacional	11822.5	17865am	
2300-2350	North Korea, R Pyongyang	11700am	13650am			2330-0000	Netherlands, Radio	6020na	6165na	
2300-2330 as	Norway, Radio Norway Intl	11795am				2330-0000	Palau, KHB	9830va		
2300-0000	Russia, Radio Moscow	4795va	4825va	4860va	7115va	2330-0000 m	Sri Lanka, SLBC Colombo	15425am		
		7150va	7170va	7180va	7300va	2330-0000	Sweden, Radio	6065eu		
		9520va	9685va	9725va	9750va	2330-0000	United Kingdom, BBC London	5975na	6175na	6195as
		9860va	9870va	9890va	12050na			7325na	9570na	9590na
		17655na	21480na	21690na				11945va	15260sa	15280va
2300-0000	S Africa, Channel Africa	4810af				2330-0000	Vietnam, Voice of	12020as	15010as	
2300-0000 vI	S Africa, Radio Orion	4810do				2335-2345 smtwhf	Greece, Voice of	7450eu	9425sa	11645sa
2300-2310	Sierra Leone, SLBS	3316do				2345-0000	Croatia, Croatian Radio	5085eu	6210eu	9830eu
2300-0000	Singapore, SBC1	5010do	5052do	11940do						13830eu
2300-0000	Thailand, Radio	9655as	11905as							

## SELECTED PROGRAMS

## Sundays

2305 BBC: World Business Review. The previous week's news and upcoming events.  
 2315 BBC: Classics With Kay. Brian Kay with his choice of classical music.  
 2335 Radio Netherlands: East Of Edam. See S 0235.

## Mondays

2305 BBC: World Business Report. The latest news from the markets worldwide.  
 2306 Christian Science Monitor: Home Forum. News and information for the family.  
 2315 BBC: Talks. Liz Edwards profiles South Asian women in "Sparks From A Precious Stone" (through April 5th).  
 2330 BBC: Multitrack 1. Tim Smith presents the smash singles on the UK pop-music charts.  
 2334 Christian Science Monitor: Letterbox. See M 0134.  
 2347 Christian Science Monitor: Religious Article. See M 0147.  
 2350 Radio Netherlands: Let's Get To Business. See M 1250.

## Tuesdays

2305 BBC: World Business Report. See M 2305.  
 2306 Christian Science Monitor: Curtain Call. Music and profiles of musicians.  
 2315 BBC: Concert Hall (except 2nd, 9th: International Recital). See S 1515.  
 2334 Christian Science Monitor: Letterbox. See M 0134.  
 2335 Radio Netherlands: Newsline. See S 0035.  
 2347 Christian Science Monitor: Religious Article. See M 0147.

2350 Radio Netherlands: No Boundaries. See T 0150.

## Wednesdays

2305 BBC: World Business Report. See M 2305.  
 2306 Christian Science Monitor: Kaleidoscope. In-depth news features.  
 2315 BBC: From Our Own Correspondent. See S 0330.  
 2330 BBC: Multitrack 2. Graham Bannerman presents new pop records, interviews, news, and competitions.  
 2334 Christian Science Monitor: Letterbox. See M 0134.  
 2335 Radio Netherlands: Newsline. See S 0035.  
 2347 Christian Science Monitor: Religious Article. See M 0147.  
 2350 Radio Netherlands: Encore! See W 0150.

## Thursdays

2305 BBC: World Business Report. See M 2305.

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2306 Christian Science Monitor: Arts Forum or Sportsworld. News from the world of arts or sports.

2315 BBC: Music Review. News and features from the world of classical music.

2334 Christian Science Monitor: Letterbox. See M 0134.

2335 Radio Netherlands: Newsline. See S 0035.

2347 Christian Science Monitor: Religious Article. See M 0147.

2350 Radio Netherlands: Research File. See M 1150.

## Fridays

2305 BBC: World Business Report. See M 2305.  
 2306 Christian Science Monitor: Encore. See M 0106.  
 2315 BBC: Worldbrief. A roundup of the week's news headlines and developments.  
 2330 BBC: Multitrack 3. Sarah Ward presents the latest from the alternative pop scene.  
 2334 Christian Science Monitor: Letterbox. See M 0134.  
 2335 Radio Netherlands: Newsline. See S 0035.  
 2347 Christian Science Monitor: Religious Article. See M 0147.  
 2350 Radio Netherlands: Feature Documentary. See W 1150.

## Saturdays

2305 BBC: Words Of Faith. See M 1209.  
 2305 Christian Science Monitor: Christian Science Sentinel. See S 0005.  
 2310 BBC: Book Choice. See W 0425.  
 2315 BBC: A Jolly Good Show. See T 1515.  
 2335 Radio Netherlands: Newsline. See S 0035.  
 2350 Radio Netherlands: Toward 2000. See F 1150.



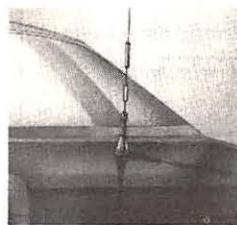
# Austin Antenna

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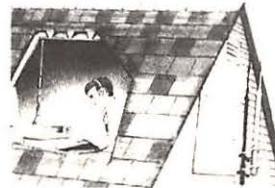
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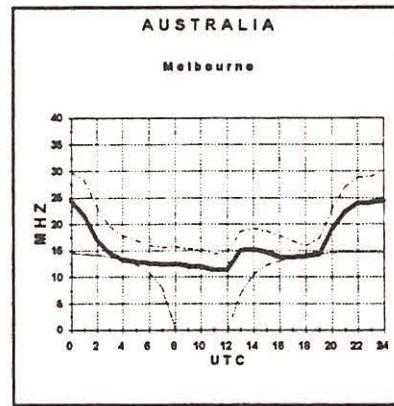
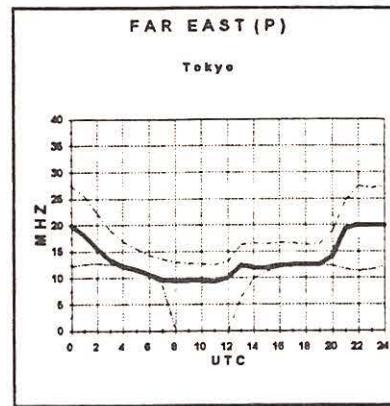
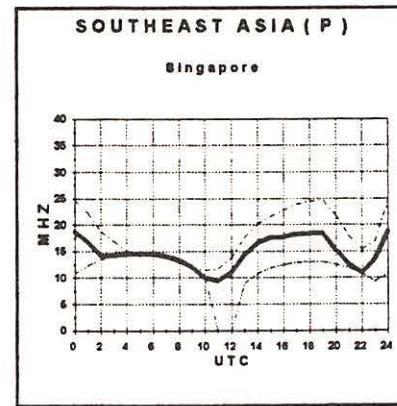
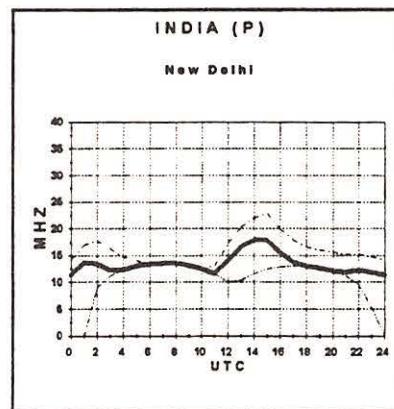
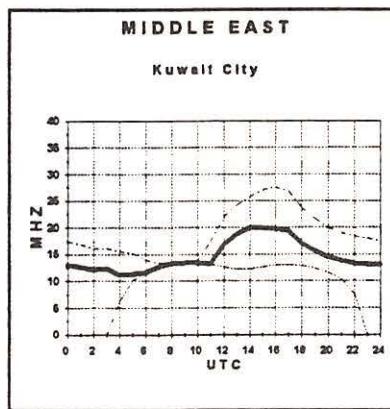
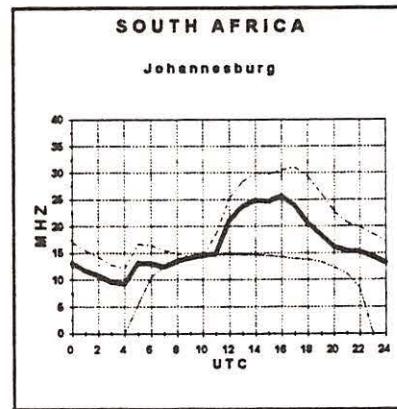
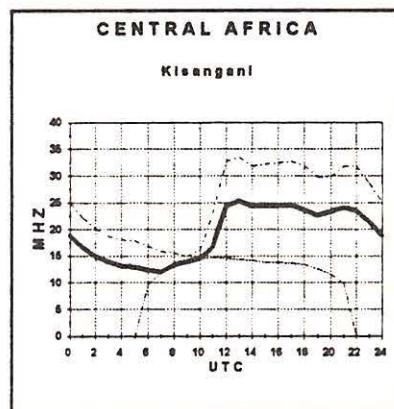
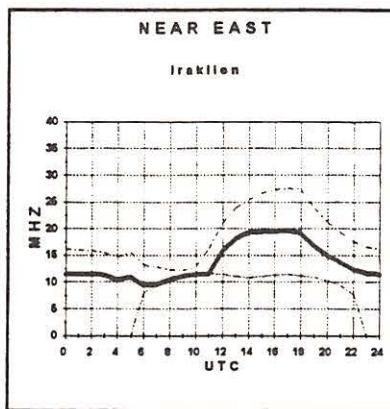
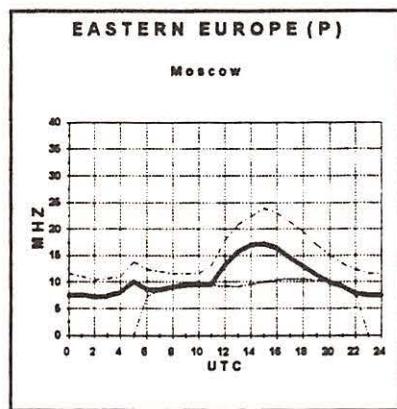
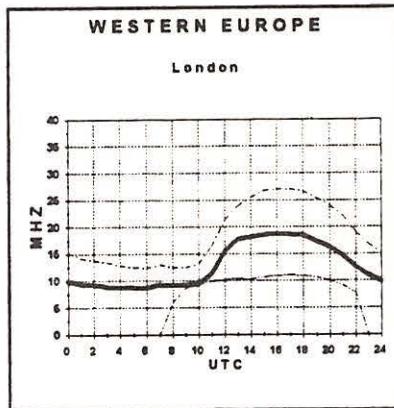
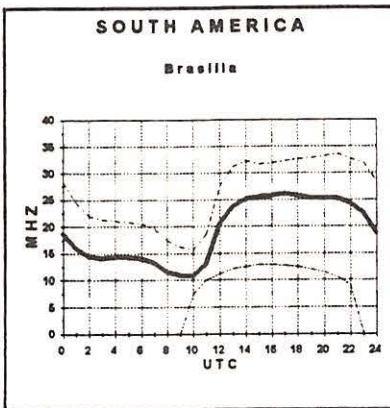
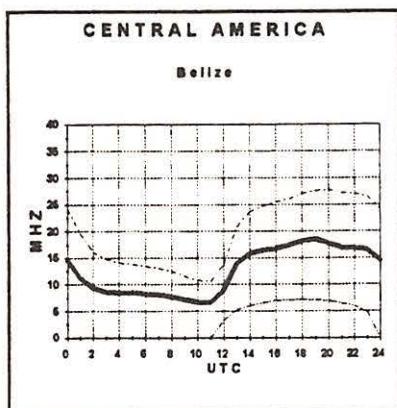
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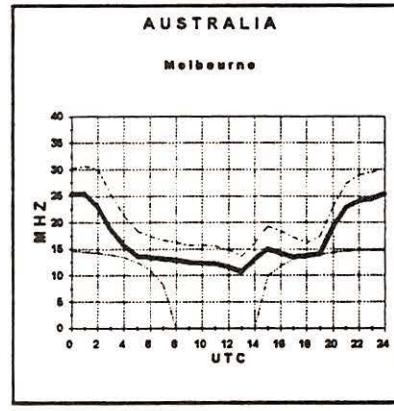
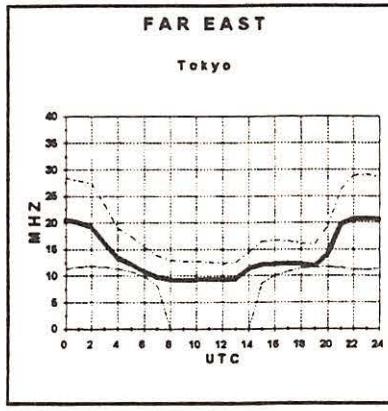
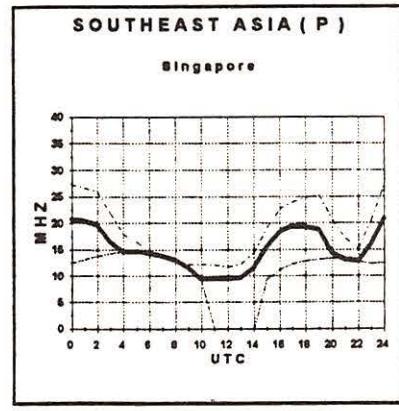
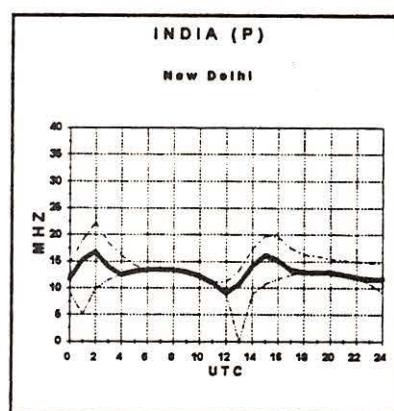
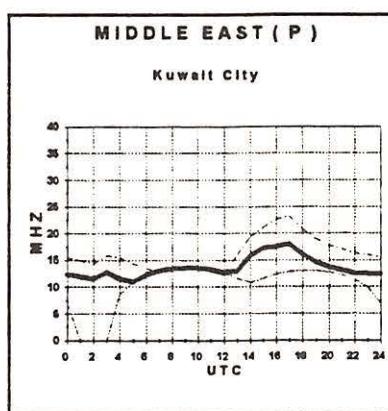
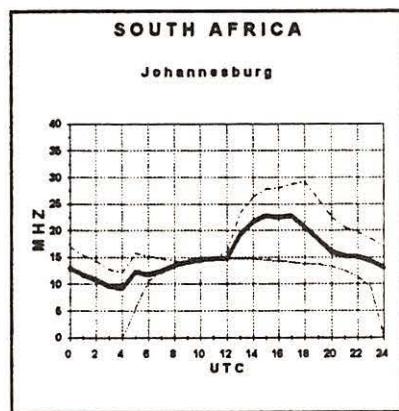
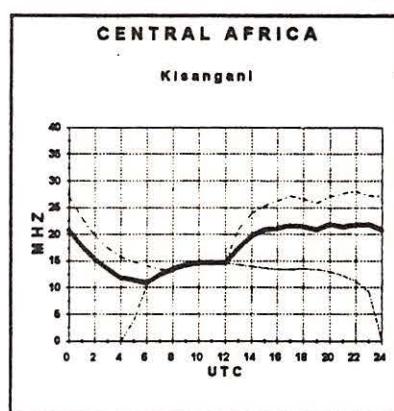
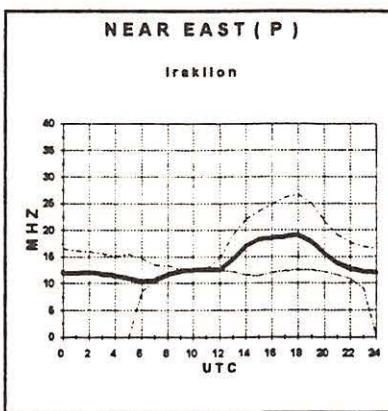
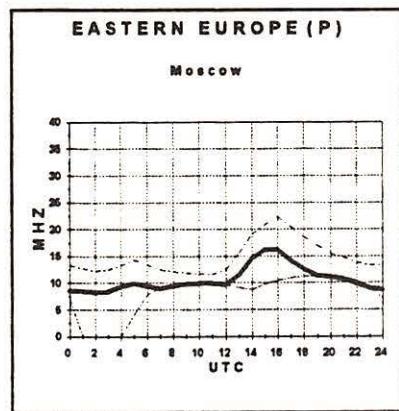
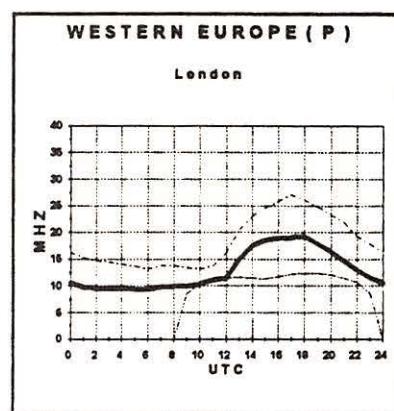
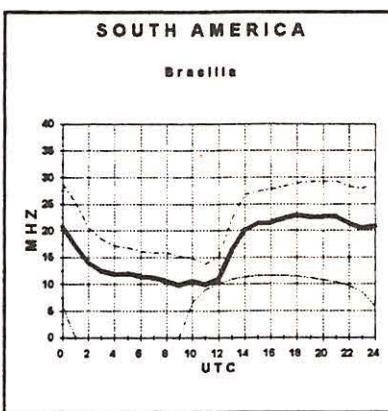
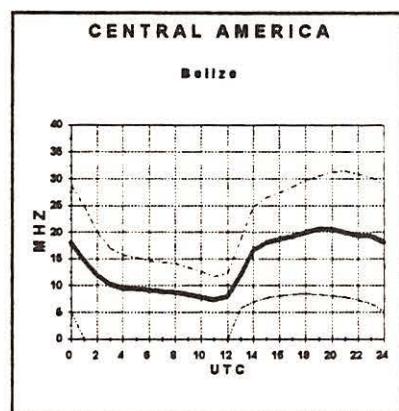
# Propagation conditions: Eastern United States

**How to use the propagation charts:** Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location. Then look for the one most closely describing the geographic location of the station you want to hear.



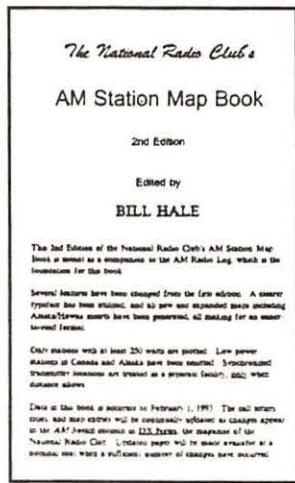
# Propagation Conditions: Western United States

Once you've located the correct charts, look along the horizontal axis of the graph for the time you are listening. The top line of the graph shows the maximum usable frequency (MUF), the heavy middle line is the frequency for best reception, or optimum working frequency (OWF), and finally, the bottom line is the lowest usable frequency (LUF). You will find the best reception along the heavy middle line. Circuits labeled (P) cross the polar auroral zone. Expect poor reception on these circuits during ionospheric disturbances.



# what's new?

Larry Miller



## Travel by AM Radio

One of the nice things about AM DXing is that you get to roam the country by radio. And there's nothing like AM DXing for getting a feel for another place — local news, personalities and even advertisements.

One way to enhance this "travel-by-AM radio" feeling is with the National Radio Club's *AM Station Map Book*. Like all NRC products, this one is super.

The *AM Station Map Book* is 170 pages of maps and information. There is usually one map for every frequency (i.e., one map for 540 kHz, one map for 550 kHz, one map for 560 kHz, and so on).

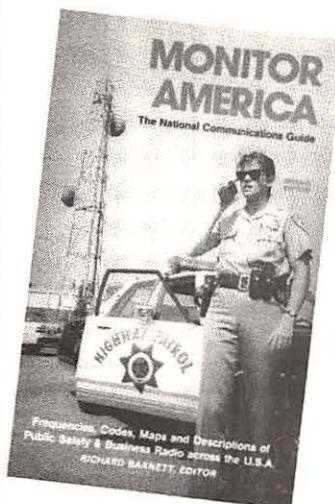
On the maps are the locations of the stations you hear. A cross-index allows you to look up a station's location alphabetically (by state) and by frequency.

The *AM Station Map Book* covers everything in the U.S. and Canada from 530 to 1600 kHz (Traveler Information Stations excluded).

The price of the book is a mere \$9.50 postpaid. To get your copy send a check or money order to NRC Publications, Box 164-MT, Mannsville, New York 13661.

## Travel by Scanner

The second edition of *Monitor America*, the perfect glove-compartment scanner frequency guide by SMB Publishing, is now available. The book, which contains over 800 pages, covers 250 metropolitan areas in the United States. Each



of the areas selected for coverage includes representative frequencies for police, fire and emergency medical services, plus other areas of potential interest.

The book is arranged by state and includes a state map and other useful information. We recommend *Monitor America* to anyone who travels extensively and who would like to sample the wide range of listening available during those travels.

Get your copy from the publisher, for \$24.95 plus \$2.50 book rate shipping (SMB Publishing, Box 428-MT, Newton Highlands, Massachusetts 02161; MA and CT residents add tax.) or from Grove Enterprises and other book retailers!

## Traveler's Guide to World Radio



If your travels take you outside the borders of the U.S., then this is the book for you. The *Traveler's Guide to World Radio* is a handy pocket guide which fits neatly in your suitcase or alongside

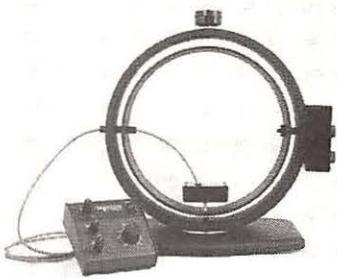
your shortwave radio and provides instant access to English language programs from 55 major cities around the globe.

Easy-to-read charts show time and frequency schedules for shortwave, mediumwave and FM broadcasting. Two hundred information-packed pages relate time conversion, main languages, electric power type, currency and country telephone prefixes and area codes as well.

Published by Billboard Books, the *Traveler's Guide* is available from Grove Enterprises (1-800-438-8155) and many other vendors for \$9.95 plus shipping and handling.

## High Performance MW Loop Antenna

Kiwa Electronics has introduced what is probably the premier piece of equipment for AM DXers — an air-core loop antenna. The "High Performance MW Air-Core Loop Antenna" tunes from 540 kHz to 1700 kHz using a main and fine tuning control. The antenna "tilt" control includes 3:1 gear reduction for precise nulling of local signals and interference and can be

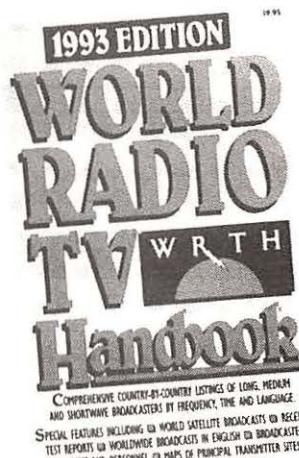


adjusted to +/- 90° from vertical. The amount of tilt can be read directly in degrees.

But wait. There's more.

The -6 dB antenna bandwidth may be adjusted from 15 kHz to 2 kHz for razor sharp selectivity. A liquid-filled compass provides bearing measurements of signals. This is no toy; This is one serious piece of equipment.

If you would like more information on the Kiwa Electronics High Performance MW Air-Core Loop Antenna, call them at 1-800-398-1146 or write 612 South 14th Avenue, Yakima, Washington 98902. Tell them *MT* sent you.



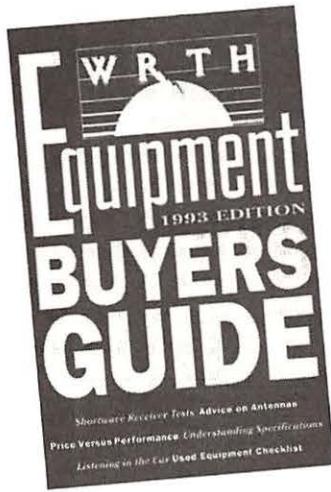
## The 1993 World Radio TV Handbook

The 1993 edition of the *World Radio TV Handbook* is the latest edition of this classic reference source. Inside, listeners will find a comprehensive country-by-country listing of long, medium and shortwave broadcasters indicating frequency,

time and language. A frequency cross-reference is included.

Special features include world satellite broadcasts, 10-1/2 pages of receiver test reports, broadcaster addresses and personnel, and maps of principal transmitter sites.

The 1993 *World Radio TV handbook* is \$19.95 and available from virtually all radio booksellers, including Grove Enterprises.



## 1993 Equipment Buyers Guide

From the publishers of the *World Radio TV Handbook* comes this handy, 270 page volume which lists receivers, antennas and accessories currently available to the shortwave monitoring enthusiast.

Products are reviewed for prospective buyers, while additional chapters explain receiver specifications in easy-to-understand terms. This excellent reference for the active SWL is available for \$19.95 wherever the *WRTH* is carried.

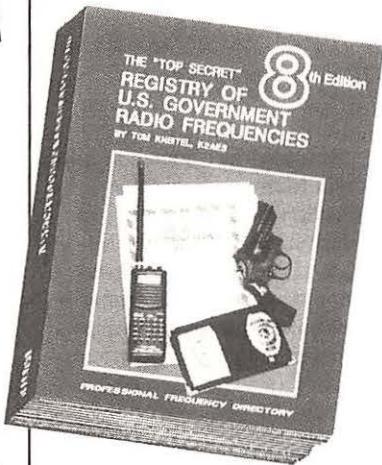
## Report Card for The Lowe HF-150

The Lowe HF-150 is a fascinating receiver, a blurring of the line between the easy-to-carry

portable and the high-performance tabletop. To get a real insight into the unit, you need to read the "Passport Evaluation," (a.k.a "RDI White Paper") by Jock Elliott and *MT*'s own Larry Magne.

The evaluation of the Lowe HF-150 is one of the better "Passport Evaluations." It's thorough, yet easy to digest, and packed with enough practical information to allow anyone from novice to jaded vet to make a completely informed purchase. Elliott and Magne have refined this form of review into an art.

We strongly recommend the "Passport RDI White Papers" before purchasing any receiver over \$100. At \$5.95 each, it's the *Consumer Reports* of shortwave radio. To get your copy send \$5.95 to IBS Publications, Box 300-MT, Penns Park, PA 18943.



## It's no Secret. It's "Top Secret"

The new 8th edition of the controversial (to some) and beloved (to others) *Top Secret Registry of U.S. Government Radio Frequencies* is now out. This is the undisputed king of the federal monitoring hill.

There are frequencies for over 80 federal agencies included, ranging from sought-after monitoring targets like the FBI to

## Computer Aided Scanning

a new dimension in communications from Datametrics



Now Radio Shack PRO 2006

owners for the first time have access to the exciting world of Computer Aided Scanning with the highly acclaimed Datametrics Communications Manager system. Computer Aided Scanning is as significant as the digital scanner was five years ago and is changing the way people think about radio communications.

• The Datametrics Communications Manager provides computer control over step by step instructions, screen displays, and reference information.

• Powerful menu-driven software includes full monitoring display, digital spectrum analyzer and system editor.

• Uses innovative Machine State Virtualizer technology (patent pending) hardware interface by Datametrics.

• Extends receiver capabilities including autolog recording facilities, 1000 channel capacity per file, and much more.

• Simple 4 step installation - no soldering or modification to normal receiver operations.

## Datametrics, Inc

Requires Radio Shack PRO 2006 receiver and IBM PC with 360K memory (640K for full channel capacity) and parallel (printer) port.

• Computer Aided Scanning system \$349

• PRO2006 receiver w/interface installed and CAS system \$749

• Manual and demo disk \$15

Send check or money order to Datametrics, Inc., 2575 South Bayshore Dr, Suite 8A, Coconut Grove, FL 33133. 30 day return privileges apply.



obscure groups like the Nuclear Emergency Search Team. There's Army, Navy and Air Force; White House; State Department; national parks, and more.

This edition also includes the 225 to 400 MHz military UHF aero band, jargon, aircraft rosters, CTCSS tones, maps, and even "a list for the secret USAF facility in Nevada named on national TV as the site where several UFO's are...under examination!"

Tom Kneitel's *Top Secret Registry of U.S. Government Radio Frequencies* is a "must have" for any serious monitor, available for \$21.95 plus shipping from many *MT* advertisers.

## New Audio Devices

Electron Processing has released two new products for the radio hobbyist. One is for shortwave and scanners, the other for scanners only. Neither seems

too impressive at first glance.

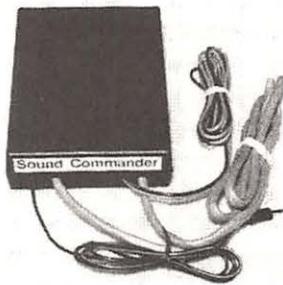
The first product is called the AFBOX-1. It allows you to connect your receiver to an existing Hi-Fi stereo system to "extract the best fidelity and clearest sound obtainable from your scanner or short-wave receiver." You connect the AFBOX-1 to the external speaker jack of your radio and the AFBOX-1 connects to the auxiliary input of your stereo.

Many people will probably ask, "Why buy an AFBOX-1 for \$30.00 plus \$5.00 shipping when I can buy a shielded Y connector cable from Radio Shack (catalog number 42-2475) for \$4.39 that will do the same thing?" This is a

very good question. Is there something this unit does that the press release didn't tell us?

The second product from Electron Processing is the **Sound Commander**. This device apparently lets you listen to your AM-FM car radio at the same time as you listen to your scanner.

Here's the scenario. You're tooling down the highway



listening to your favorite station. A call comes in on the scanner. The Sound Commander switches off the audio from your car radio and replaces it with the scanner audio. When the transmission on the scanner ends, the AM-FM switches back in.

My thoughts on this one: unless you live in a real one-horse town where scanner communications only occur every five or ten minutes, or you're a mobile unit with selective calling capability, this thing is going to get annoying real fast. If you live in an area with a normal amount of communications, the Sound Commander is going to be flicking between your car radio and the scanner every time someone keys and unkeys a microphone. The mind reels.

The Sound Commander is \$80.00 plus \$5.00 shipping. To order or to get more information on either product, write Electron Processing at P.O. Box 68-MT, Cedar, Michigan 49621 or call 616-228-7020.

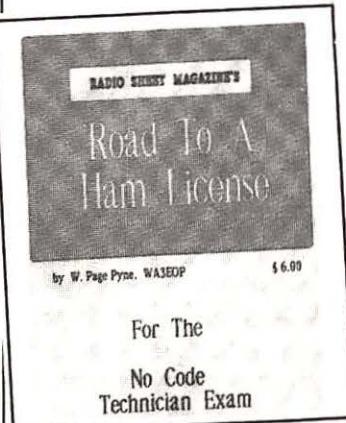
## SaskatcheScan

A firm called J&M Communications has released a scanner frequency guide for Saskatchewan. The spiral bound book runs some 110 pages and

contains a wide range of information, including basic "getting started information" on antennas, codes, and frequencies — lots of frequencies.

The first list is arranged by location and includes service and use information. The second list is arranged by frequency and it, too, contains the same location/service/use information.

The *Saskatchewan Frequency List* is a professional piece of work that retails for \$13.95 plus \$3.00 shipping. Send your check or money order to J&M Communications, 3149-MT Beverly Crescent, North Vancouver, BC, Canada, V7R 2W4.



## Road to a Ham License

It's hard to give a bad review to someone you know is trying very hard. Such is the case with "Road to a Ham License." This 33 page booklet (5-1/2" x 8-1/2") is a reprint of the series in *Radio Sheet* magazine. *Radio Sheet* magazine is an admirable buy-sell-swap publication by W. Page Pyne, WA3EOP.

The booklet is printed using a dot matrix printer and small type. The text gives you the info you need, skip the entertainment and inspiration. It is billed as a "no frills...quick study guide" for the No Code Technician Class Amateur Radio License, and that's what it is.

You can get your copy for \$6.00 postpaid from *Radio Sheet* magazine, 23 North Locust Street, Dept. MT, Hagerstown, Maryland 21740.

## Old Lafayette Radio

Looking for a Lafayette radio manual? Pete Markavage claims to have the largest selection in the country, "from their earliest products to the last...they sold."

Markavage also has Nation, Clegg, Heathkit, Johnson, and other manuals, including user, operating, and service manuals, addendum sheets, specification sheets and service notes. Says Pete: "If I don't have it, they probably never printed it."

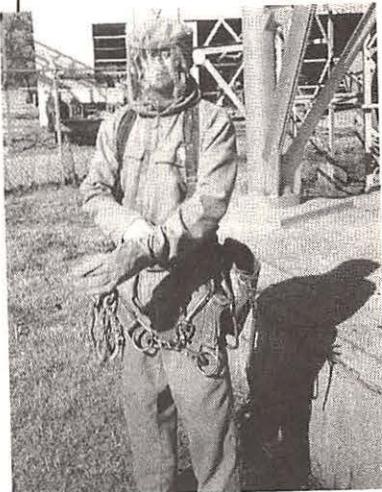
For a price quote on a specific manual, contact Pete Markavage at 27 Walling Street, Sayreville, New Jersey 08872 or call 908-238-8964. A self-addressed, stamped envelope is required. Tell him *MT* sent you.

## Eavesdropping and Espionage

Intended as a course in brief, Kevin Murray's booklet, "Electronic Eavesdropping and Industrial Espionage," is subtitled, "The Missing Business School Courses." It is primarily intended to inform companies of their vulnerability to electronic invasion of their assumed privacy.

But the easy-to-read folder is far more informative than that; it provides an excellent perspective on the entire electronic espionage field, with explanations of debugging equipment and methods, statistics on actual bugging cases, and even advice on how to find counterespionage experts as well as a bibliography of books and articles on the subject.

This 15-page brochure is worth much more than the \$2 asked to cover costs and postage! Write Kevin Murray, P.O. Box 5004, Clinton, NJ 08809 and mention *Monitoring Times*.



## The Ultimate Protection

Every day it seems that more and more people are raising questions about the relationship between exposure to radio frequency (RF) radiation and cancer. (See item in "Communications".)

For professionals who risk frequent exposure, or for the radio hobbyist who has gone around the bend with his hobby, Maxwell Safety Products has introduced the RFP Protective Suit from Naptex.

Naptex, a fabric which looks and feels like broadcloth cotton, integrates a stainless steel microfiber core. The material provides a minimum of 15 dB attenuation (about 30 times) of electric fields up to 1000 MHz.

The Naptex overall contains two breast pockets, Velcro/zipper closures and a removable, integrated hood. The suit can be machine washed and dried repeatedly with no measurable effect on its shielding performance.

The Naptex RFP Protective Suit is available in four standard sizes, small to extra large, in a high-visibility, safety orange color. It retails for \$699.00. For more information contact Don Doty at 214-293-1200. Tell him that *Monitoring Times* mentioned the suit.

"What's New?" solicits review copies of new books and equipment related to the radio hobby.

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Collins R390A (Reconditioned/Calibrated)	CALL
Japan Radio NRD-525	\$1125
SONY ICF-2010	\$ 349
SONY ICF-7600	\$ 220
SONY Pro-80	\$ 370
RACAL RA-6790 (GM)/R-2174	CALL
<b>Bearcat BC-760XLT - w/Cellular Restoration</b>	<b>\$ 285</b>
Bearcat BC-200XLT - w/Cellular Restoration	\$ 275

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## Review By Bob Grove

### Digital Decoder

Digital signalling is automatically read by this slick, new decoder from Connect Systems, Inc. Powered by any external 12 volt DC, 100 mA source (not supplied), the CD-1 features a large, bright LED window with automatic mode recognition and display of up to four digits including decimal.

Intended initially as a low cost piece of test equipment for the land mobile industry, the CD-1 is preferably attached to the detector output of any transceiver, receiver, scanner or service monitor. For some applications, a connection to the receiver's audio output jack is all that may be required.

The CD-1 accurately shows—and holds for about two seconds after the signal drops out—any of the 50 CTCSS (subaudible) squelch tones (67.0-254.1 Hz), 104 DCS (digital) codes (023-754) and even the 16 DTMF (telephone dial 0-9, \*, #, plus A B C D) tones detected over the air. A string of up to 128 DTMF characters can be stored and replayed.

For surveillance purposes as well as mobile radio servicing, it will show ANI codes on mobile phones, determine which "PL" tones



are used on a network, who a mobile phone is calling, and other determinative functions as well.

Although the DC-1 is warranted against factory defects for one year and the well-built unit should not be expected to fail in normal service, the instructions include a full schematic diagram for those who would like to attempt any necessary repairs.

The decoder is housed in a rugged, all-metal cabinet measuring 4.9" W x 1.8" H x 4.6" D and weighing 8 ounces. Connections are made via a four-screw barrier strip on the rear apron. Inter-

nal straps allow custom adjustment of appropriate levels when the unit is connected to a suitable receiver or service monitor. Audio levels of 10 millivolts to 4 volts are accommodated.

During our lab tests we found the CD-1 to be reliable, easy to connect and accurate. It is an excellent accessory for the serious communications technician.

The CD-1 digital decoder unit is available for \$199 plus shipping from Connect Systems, Inc. (CSI), 2064 Eastman Avenue, #113-MT, Ventura, CA 93003; phone 800-545-1349.

## Uniden BC172XL



Until the high-end Bearcats come out this spring and summer, we will take a look at one of the "sleepers"—low end units that made the marketplace over the last couple of months. Our sampling this month is the new BC172XL.

The 172 is a Uniden-labeled production run of the Realistic PRO-2023 which Uniden originally made for the Tandy organization for distribution through Radio Shack outlets.

The low-profile desktop works only from 120 VAC, 60 Hz and is not equipped with a DC power plug for mobile operation. A plug-in telescopic antenna is provided for the Motorola jack on the rear apron.

Frequency coverage is 29-54 MHz (narrowband FM), 108-136 MHz (AM), 136-174 and 406-512 MHz (narrowband FM).

No 806-960 MHz band reception is provided. There is an automatic 162.400-162.550 MHz weather scan function.

Up to 20 channels may be memorized and scanned at 10 channels per second. Any channel(s) may be locked out of the scan sequence, and a selectable two-second delay may be chosen for any channel(s). Channel 1 may be prioritized and sampled every three seconds.

The 700 milliwatt audio amplifier delivers clear, strong sound through the unit's internal speaker. A 1/8" mini jack on the front panel permits use of an earphone or external speaker.

A recessed, rear-panel "reset" button allows all memory contents to be cleared. The green backlit LCD is sharply visible under subdued lighting conditions.

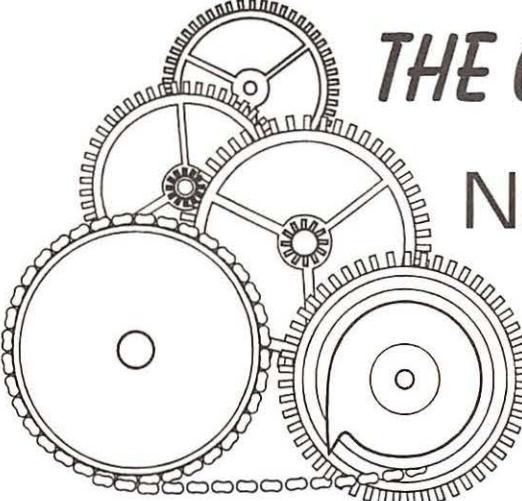
Sensitivity is specified as 0.5 microvolts from 29-174 MHz and 1.0 microvolts from 406-512 MHz (FM mode, 20 dB S/N, 60% mod.). AM sensitivity (20 dB S/N, 3 kHz dev.) for the 108-136 MHz aircraft band is 2.0 microvolts.

Selectivity is a respectable +/-11 and +/-15 kHz and 16 and 150 dB respectively. The squelch control includes an automatic-level-detecting "auto" position, eliminating the need to manually adjust for the optimum setting.

### The Bottom Line

We would recommend the BC172XL for rural applications where low cost and non-800 MHz operation are guiding factors.

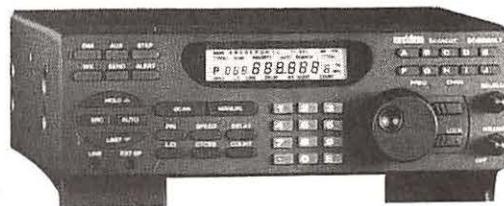
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# Sangean's Outstanding New Travel Portable



It's been five years, now, since Sony introduced its excellent ICF-SW1S mini portable. This little gem has captured the quality end of the mini-portable market, and for good reason: For the most part, even though it's tiny it performs nearly as well as more conventionally sized advanced-technology models.

Sony's 'SW1S also comes with a number of useful accessories for the traveler, including a fishing-reel-type outboard wire antenna and an AC adapter that automatically adjusts itself to whatever voltage it happens to be plugged into. We gave it, and continue to give it, high marks in *Passport to World Band Radio*, but the price — \$359.95 — doesn't endear it to most travelers. After all, not only is that beaucoup bucks, but when you're traveling, your radio is most exposed to the risk of theft and damage.

## Mini...Just!

Enter Sangean, continuing in its established paradigm of coming in a little late, but with a competitive product at a lowball price. The new ATS 606p -- nigglers will note that Sangean's spacing and punctuation varies -- is \$269, cheaper than Sony's entry. At the same time, although

technically a mini, its 5-3/4" x 3-5/8" x 1-1/4" is clearly not so mini as Sony's itsy offering.

The '606 weighs in at 14-1/2 oz., nearly one pound, with its full complement of three "AA" batteries. The plus of this extra heft is that it has a speaker which delivers at least reasonable audio quality for shortwave, even if it's only mediocre for FM. Unless you absolutely, positively need the tiniest radio available, this improvement on audio quality over that of the 'SW1S makes the '606 a preferable choice, even forgetting other considerations.

## Tuning Configuration Reasonable

The '606, which has no tuning knob, selects frequencies via up/down slewing controls, frequency scanning using those same controls, 45 presets (19 for shortwave) by a keypad, and direct-frequency entry with that same keypad. There is also scanning of the longwave, AM and FM presets, but *not* those for shortwave. The keys have excellent feel, comparable to those of the renowned IBM PC keyboard, although the zero is below the "7", rather than below the "8"

as on telephones — a silly characteristic of all Sangean-made keypads.

The '606 covers longwave from 153-513 kHz; AM from 520-1710 kHz; shortwave from 1715-29995 kHz; and FM, which is in stereo through supplied earpieces, from 87.5-108 MHz. Tuning is in 9 kHz steps on longwave, which is used for broadcasting in North Africa and parts of Eurasia; switchable 10 kHz (Americas) and 9 kHz (elsewhere) steps on AM; 5 kHz steps on shortwave; and 50 kHz steps on FM. A small aside is that our new '606 came with AM set to the wrong (9 kHz) position from the factory, so be sure to check this when you unpack the radio.

## Travel-Oriented Features

When these factors are added to the travel power lock and the self-setting, multi-plug 110-230 VAC adapter, the result is a truly international receiver for travelers. Only the 66 MHz OIRT FM band, which is already being phased back in most parts of Eastern Europe where it is used, is not covered.

The '606 has two 24-hour clocks, neither of which is displayed when the received station's



## ScanStar™

# Star of the Software World?

### Best Laid Plans

Well, the old C-64 that I spoke about in the last column is not yet repaired. So we will have to hold the discussion of that software for another time. This month we'll look at a program that was reviewed by me many months ago, but never made the pages of *MT*! Why? Well, reviewing software can be done on a "from the manual" approach; the review is written from just reading the manual, or turning on the program for a few minutes. This is very efficient for getting lots of reviews out the door, making software manufacturers happy with the exposure and providing the author/magazine with an article in a short time.

However, the philosophy in this column to date has been very different. To duplicate the experience you are likely to have in real-life applications is the purpose behind this column. Using this approach requires me to spend hours and sometimes days operating a program to give it a fair assessment and a clear review, since program bugs don't run across the screen like Pac-Man announcing their presence.

Well, sometimes after all this work on a program I get a surprise package in the mail: the next version of the program I've just finished! No one to blame; in fact, I like to see the software guys making their product better. But for me it's lots of wasted effort. So it was a few months back with Scan\*Star. But now you'll get to read about version 2.30 of Scan\*Star, Receiver Management Software. Scan\*Star, referred to as S\*S for this article, is quite an ambitious attempt at a total monitoring environment. Receiver control, logging, scanning, search and store, and control and display of digital decoding units such as the PK-232 or KAM are all within the domain of S\*S.

### Start-Up

S\*S requires an IBM AT clone (80286, 386 or 486) with serial port(s), a minimum of 640K RAM, a floppy disk, hard disk and just about any monitor. A serial to TTL converter is required for the control of most receivers. This review was done on a 386 20MHz with 4meg RAM. The program is run from the hard disk.

The number of receiver control files which are included in S\*S range from HF receivers such as the ICOM R71 and Drake R-8 to scanners such as the Yaesu FRG-9600 and ICOM R7100. The



list is impressive. For this review we used the R71 and the FRG-9600 and they performed flawlessly using their interfaces. A stapled paged manual and a "Getting Started" document comes with the S\*S and includes some very useful schematic diagrams for interface units for those of you with soldering ability.

The control of S\*S is from two types of screens: menu lists and the use of the function keys. The menus are nested, meaning that by using the up/down arrow keys to highlight your choice and pressing the Enter key, another menu appears with secondary choices for you to make in the same manner. These screens are well done and straightforward.

The other method which is required in major parts of the program is use of the function keys such as F5. Because of all that S\*S has attempted to do, it requires each function key to represent four functions by using the Shift, Control and Alternate keys in concert with each function key. The simple F1 key brings up a screen full of multiple keystrokes and their corresponding commands; BUT, it is a screenfull, and I found it awkward to use.

### Scan Control

S\*S has four scanning modes which will give you just about any combination you can imagine. Scanning a file that you have previously created is the simplest. Scanning a range of frequencies is possible with manual storage of active frequencies. Or, the third is automatic storage of active frequencies.

The fourth mode, called Flex\*Scan, allows the user to combine any of the above modes, and various files together. Therefore, for some part of this combined file, it will scan a frequency range and store the active channels. For other parts it will scan a list of previously stored station frequencies. So you can listen to known active channels while searching for new ones. You can even determine how much of the scan time you want to spend on each mode!

Another nifty feature is the Heap. I don't know about you, but every time I erase a frequency or other previously stored info, I stop and wonder if I'll ever need it again. Heap is a file where erased info goes to, JUST in case you need it in the future.

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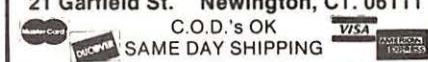
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Presentation of data can be via the Spectrum Analysis feature. However, for the receivers I used (as well as a Demo receiver file which does not require a real receiver to be connected), the screen came back with the words "Spectrum Analysis not supported by this receiver file." It was not a pleasant message to see, when one assumed the list of receivers supported for receiver control could also be displayed for spectrum analysis.

The screen which displays the output from a decoder such as the KAM or PK-232 is well laid out and comprehensive in function.

### Summary (of my impressions)

Scan\*Star was designed to address our *total* monitoring environment requirement; a tall order. In many ways it has hit its mark: flexibility of radio types, Flex\*Scan function, Heap function, screen set-ups to accommodate all types of computer monitors and a "never leave the program" approach to monitoring.

However, Scan\*Star does have some major low points in my opinion. The "user interface" has not been adequately taken into account, leaving the program very computer technocratic in its operation and even its terminology. The complexity of the keystroke sequence operation (fifteen million different combinations of keys and functions) is not exactly user friendly and a source of constant confusion even with the Help key.

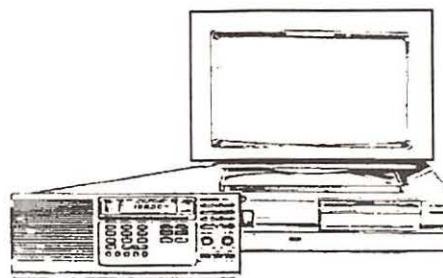
Editing of station information cannot be done "on the run." Instead, the monitoring screen must be exited and the data editing screen entered. This switching is not consistent with the way we use a paper log. In a similar manner, terms have been created by the author which may fit in a computer programming environment, but is neither familiar nor useful in describing the function for its intended radio monitoring users.

For example, Time Slots are not GMT clock on/off times, but instead what we would call channel delays. Files which hold our Logs are called Data Sets. These terms are accurate technically in the computer world, but meaningless to the user of this program, the radio monitor. All programs are written by programmers, but few users are programmers. The programs must be written in the language of the user. Catch the movie *Tron* to see what I'm trying to convey.

On the user's side is a Scan\*Star BBS telephone number that users can use to contact the company and ask technical/operational questions. This is an excellent idea!

Scan\*Star version 2.3 is a good attempt at a difficult and complex task. All the pieces are there, but the next version of Scan\*Star should concentrate on making the program much more

user friendly. Until then, in my opinion, Scan\*Star version 2.3 is not for the beginner or even the intermediate user. Scan\*Star is available for \$49.97, from V Communications Inc., San Jose, CA, telephone 408-296-4224. Check their ad in *MT* for any additional information in this rapidly changing world of software.



### Computer Transmitters?!

Bob Grove passed to me a letter concerning a reader's problems with computers and radio frequency interference (RFI). Computers are transmitters! We cannot escape this. I have a 40 MHz transmitter in my 386 desktop modulated in lots of different weird and not wonderful ways. Although the case and internal shielding are very important in determining the RFI of a computer, external factors can also help the situation. All cables coming from the computer can act as antennae for digital signals internal to the computer.

Additionally, the cable is there for a reason; to conduct signals to printers and monitors. *Even more* RFI. Positioning the computer away from the receiver's antenna and the shack's electrical AC cables within the wall may help. Using only high quality shielded connecting cables will help. Plugging the computer into a different AC wall outlet than the receiver may help. Wrapping RFI ferrite inductors, available at Radio Shack, around each cable (keyboard, monitor, TNC, receiver, etc) will help. The phases of the moon may help!

Get the idea? The cure is not foolproof and don't let anybody tell you differently. Near-field signal propagation of a signal as complex as this is an art, not a science. But each of the things we mentioned will help reduce the problem.

Incidentally, for many years the spies from various nations listened-in on their "targets" without ever stepping foot inside the target's super secure, armed-guarded building. How? Receiving their target's computer, fax and printer RFI and reading it like they were directly wired to it via a cable! Next month, "DXing your neighbor's computer." ONLY KIDDING. 'Til next month!



## Balanced Feeders for Shortwave Antennas

You may wonder why anyone would want to use balanced feeders for a multiband SWL antenna. Good question, indeed!

Well, compared to an end-fed random length wire, the multiband dipole has a lot to offer, especially if it is erected as an inverted V. Tuning the system for the frequency of interest ensures good reception and better immunity to the pickup of man-made local noise, because the feed line is balanced and does not act as a part of the overall antenna system.

Although a closed full-wave loop antenna offers the best immunity to noise pickup, an inverted V with properly balanced feeders can be a joy to use. Ordinary 300-ohm TV ribbon line is fine for feeding the antenna, or you may want to minimize feeder losses by using home-made open-wire line, or vinyl insulated 450-ohm "ladder line."

### The Mechanics of an Inverted V

The overall length of an inverted V (Figure 1) is calculated the same way as for a straight dipole. The length in feet is obtained from  $468/f(\text{MHz})$ . The antenna is cut for the lowest frequency of interest and is fed with 300 ohm TV ribbon of any convenient length. To help assure proper results, the feed line should be centered between the two legs of the antenna.

If you use a horizontal dipole instead of a V, the feeders should be routed away from the antenna at a right angle, thus forming a T-shaped configuration. In other words, the feeder should not run off at an angle which brings it close to one of the dipole legs. This will destroy the balance of the system.

Inverted Vs are popular because they require but one major supporting structure. You may use

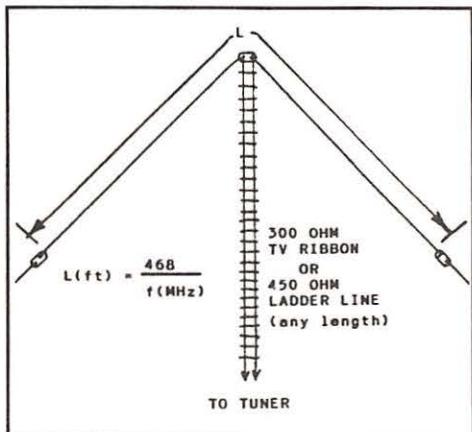


Figure 1: Details for a half-wave inverted-V antenna. This antenna is suitable for multiband use, is omnidirectional and has a radiation angle that is good for DX reception.

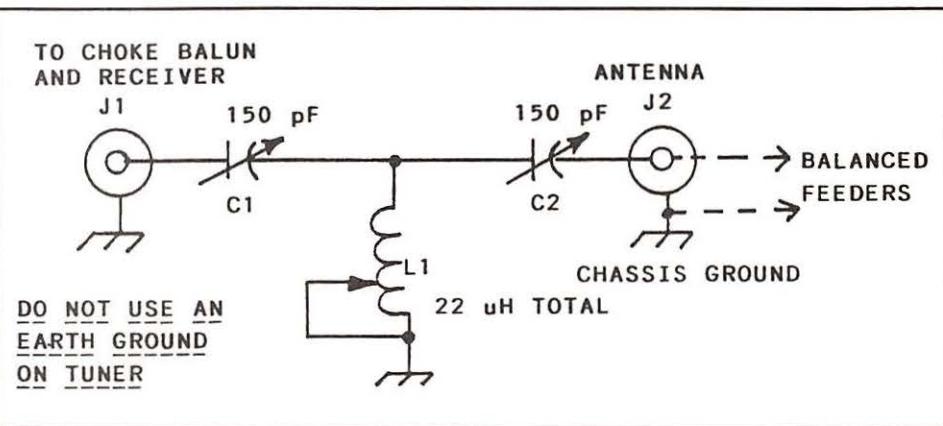


Figure 2: Schematic diagram of a T-network tuner that is suitable for use with the antenna in Figure 1. C1 and C2 may be small variable capacitors that have 140 pF or greater maximum capacitance. Do not use variable capacitors that have more than 365 pF maximum capacitance. L1 may be a roller inductor or a hand-wound coil with taps every three turns. A multiposition wafer switch may be used to select the coil taps. L1 may be wound by placing 36 closewound turns of no. 22 enamel wire on a 1-inch diameter coil form. Note that one side of the balanced feeders connects to J2 and the other side is attached to the ground bus (chassis ground) of the tuner. See text for further details of this hookup.

a metal tower or mast, a tree or a wooden mast. The two dipole ends, near ground, need be only a few feet above ground. This requires only a simple 5- or 6-foot wooden stake. You may also guy the ends to a tree or man-made structure if that is convenient.

The enclosed angle at the apex of the V should be on the order of 90 degrees for best performance, although angles as great as 110 degrees offer good results. Inverted Vs are omnidirectional and exhibit vertical polarization when the apex angle is approximately 90 degrees. Reasonably good low-angle radiation results and this is

good for DX reception. Needless to say, the higher the center of the antenna, the better its performance. An ideal horizontal dipole or inverted V would be at least 1/2 wavelength high for the lowest operating frequency.

### What is the Minimum Useful Antenna Length?

Perhaps you have insufficient room for a full size dipole. If so, you can make the antenna shorter and accept a reduction in performance at the lower end of the frequency range. The

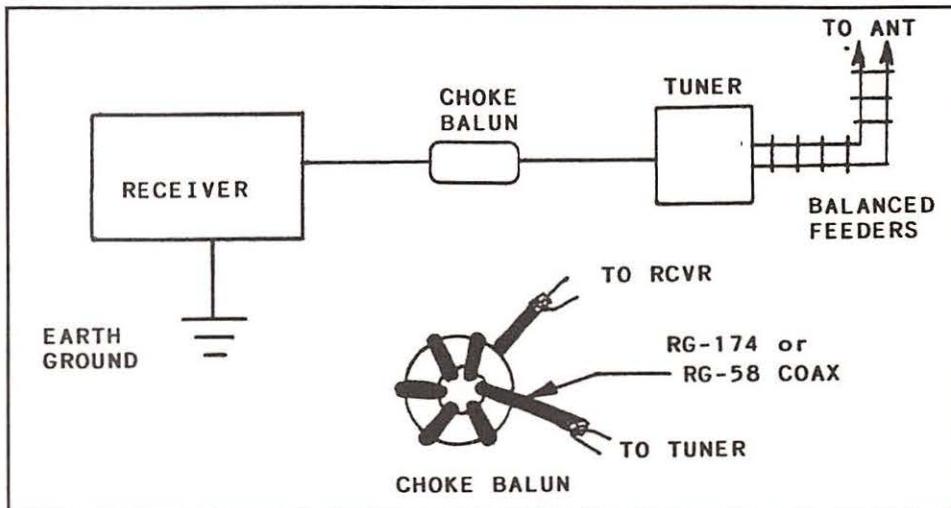
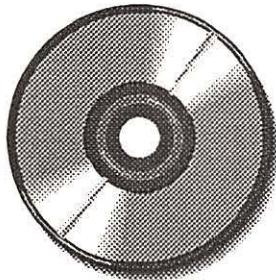


Figure 3: Block diagram of how the receiver, balun and tuner are connected. Connect an earth ground to only the receiver. Use 50-ohm coax between the balun and the receiver and tuner, as shown. The choke balun contains 12 turns of RG-175 miniature coax cable looped though the toroid as shown in the inset drawing. Use an Amidon Assoc. FT-140-77 ferrite toroid (2000 mu) or equivalent. If RG-58 coax is used, order an FT-240-77 toroid core and use as many turns as the core will hold (single layer). Order from Amidon Assoc., 2216 E. Gladwick St., Dominguez Hills, CA 90220. The choke balun and Figure 2 tuner are satisfactory for use from 1.8 through 30 MHz with the constants shown.

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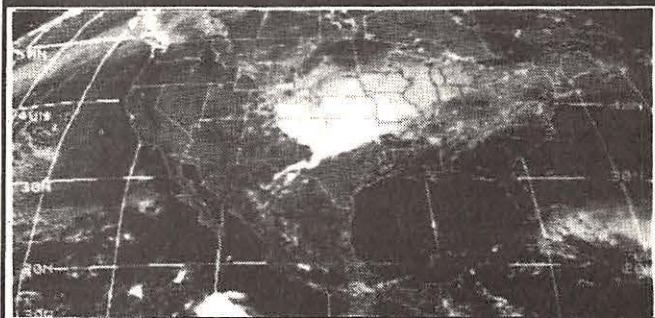


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antenna may still be tuned, under this condition, for resonance at the lower frequency. Signals will not be as strong as if the antenna were full size, but reception will be okay.

## Do You Need an Antenna Tuner?

An ideal system has an antenna tuner. You may use any of the low-power commercially made ATUs (antenna tuning units) that are designed for low power (less costly), or you may elect to make one of your own. Figure 2 shows a simple T network that can do the job. The tuner should be designed for use with balanced feeders if this is done.

The homemade tuner of Figure 2 (or any single-ended tuner) may be used for balanced feeders by "floating" it above RF ground.<sup>1</sup> This requires a choke balun device between the tuner and the receiver, as shown in Figure 3. Alternatively, you may insert a 4:1 balun transformer between the tuner and the feed line to provide balance. A balun of this type may be used without an ATU by inserting it between the tuner and the antenna, but this does not ensure the maximum reception afforded by a tuner.

I use the method illustrated in Figure 3 for my amateur station. My inverted V is cut for 1.9 MHz and I use it from 160 meters through 10 meters with excellent results. I employ 450-ohm ladder line for the feeder and the apex of my inverted V is 70 feet above ground. I use a homemade T network of the type shown in Figure 2. I adjust my ATU for an SWR of 1:1 when setting it for a chosen operating frequency. However, the ATU controls can be adjusted for maximum response on a weak signal. This equates roughly to a proper match between the antenna and the receiver.

You can use any type of single-ended ATU for balanced feeders, such as an L network, T network or what have you, provided you follow the lashup of Figure 3. This means that no earth ground can be connected to your ATU. As stated earlier, it must float at RF.

The only factory made balanced antenna tuner I am aware of was produced by the E.F. Johnson Company many years ago. These units are still available at flea markets from time to time. They are called "Johnson Matchboxes," and they come in low- and high-power models. No balun is required with these tuners.

Information about building your own toroidal balun transformer can be found in *The ARRL Handbook* and in *The ARRL Antenna Book*.<sup>2</sup> You may buy a commercially made balun if you do not wish to build your own unit.

## In Conclusion

Good shortwave reception is important to all of us. What we can copy when logging DX is almost entirely dependent upon the antennas we use. A mediocre chunk of wire that is only a few feet above ground will usually provide dismal results. If you place emphasis on getting your antenna up in the air and of the optimum length, plus matching it to the receiver, you will be amazed at what you can hear on a good day or night! Certainly, an inverted V with balanced feeders is a step in the right direction.

## Reference

- 1) A. A. Roehm, W20BJ, Some Additional Aspects of the Balun Problem, *The ARRL Antenna Compendium*, Vol. 2, page 172.
- 2) ARRL, 225 Main St., Newington, CT 06111; 203-666-1541.

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## Frequency Counting Your Way to Fun and Profit

Well, I'm not so sure about the *PROFIT*, but a frequency counter sure can enhance and heighten the fun you get out of playing radio. I suppose the profit can be there for you techie types, too. I remember my profits going up after my first frequency counter was acquired in 1975. My fun went through the roof, and yours can, too, if you're armed with a little knowledge about how to use a frequency counter and if you know how to work within their limitations and constraints.

Modern frequency counters are a relatively sophisticated by-product of high technology, but they are very easy to operate and not difficult to understand. To convey the general principle of how one works, imagine yourself wanting to know how many vehicles are on the freeway at rush hour. It would be impossible to conjure up the patience to sit there and count 'em for a couple of hours, and what if you lost count halfway through the ordeal? Yet, you could come up with a very good approximation by counting the number of vehicles that pass for one minute; then multiply that number by 60 to estimate how many would pass in an hour.

That is precisely how a frequency counter works, albeit the mathematics and timing are built in so that all you have to do is look at the display. Essentially, then, an AC or RF signal is admitted to the unit, amplified to a suitable level; and then passed through an actual counter device which is triggered by some sort of a "gate" or a calibrated **start and stop** mechanism, typically 1-second. It could be much shorter or longer, depending on the brand and settings of the instrument.

Fundamentally speaking, if a million waves pass through the gate in one second, then the frequency is 1 MHz or 1-million cycles per second. If ten million waves pass through the gate in ten seconds, the frequency is still 1 MHz. Same, if 100,000 waves pass through the gate in a tenth of a second. The width or duration of the gate is not nearly so important as is the accuracy!

Suppose that a 1-second gate were off by 1%? Then a 1 MHz reading could be as low as 990,000 Hz or as high as 1,010,000 Hz. If 10 MHz, then 1% is equal to 100 kHz; at 100 MHz, a 1% error is 1 MHz. At an audio frequency of 1 kHz, a 1% error is 10 Hz. Get the picture here? If your frequency counter is off by 1%, you're in trouble, Bubba!

Modern frequency counters are quite accurate, typically to within one part in a million for

*Why is using a frequency counter like tallying traffic at rush hour? And why should it matter to you?*

*Pictured:  
Optoelectronics  
Model 2300  
Frequency  
Counter*



hobby-grade units and better instruments are accurate to within one part in 10-million or even one part in 100-million. The key to accuracy of a frequency counter is in the stability and accuracy of the TIME BASE; the thing that gates the signal to be measured! The actual counter part has little or no relevance to the accuracy of a frequency counter; it just counts, much like a turnstile counter at your local stadium. Every wave that passes through the counter adds a "click" to the count. It can hardly go wrong. But there is a lot of difference between a hundred and a million of those "clicks," and it's the Time Base that matters: how many counts in a definite period of time! That time interval has to be as accurate as possible.

All frequency counters have a Time Base or Reference Oscillator with hobby grade instruments using either 3.57 MHz or 10 MHz as a standard. Furthermore, these reference oscillators are calibrated at the factory by means of an internal adjustment. Hobbyists are given to adjusting things for the purpose of making them better, but the Time Base of a frequency counter is one thing you'd best not mess with unless you know exactly what you are doing. Even then, you're likely to be better off leaving that adjustment alone!

Other than accuracy, there is really only one other aspect of frequency counters that you need to know much of anything about: sensitivity. Back to our freeway traffic analogy for a moment: if you are standing a mile away from that freeway, you're not likely to get a very good count because you won't be able to clearly see all the traffic that passes within the minute. Likewise, if you are standing right in the middle of

that freeway, you won't last long enough to make the count.

In other words, there is a certain range of signal level over which a frequency counter can work and be expected to be reliable. Not enough signal, and it won't be able to count every wave that passes during the gate time; too much signal and either something could blow up or at best, the count won't be accurate because of overload. Rarely will you have to be concerned with too much signal, especially outside the lab, though ham and CB operators will want to ensure that their transmitters are not keyed directly into a frequency counter. SWLs' and scannists' primary concerns will be getting enough signal into the frequency counter to trigger it properly for an accurate display.

There's the rub, for lots hobbyists are under the impression that a frequency counter can measure radio frequencies right out of the air. Rarely can this be the case, unless the instrument has the proper antenna and it is positioned relatively close to the transmitter. It is possible to measure the frequency from a handi-talkie from distances of 50 to 100-ft, but typically, the distance has to be within 20-ft or so! Direct frequency measurement right off the air is, at best, a hit or a miss sort of a deal, and a lot of patience and experience is required to become proficient. Here are a few hints and kinks that I have discovered along the way.

### Boosting the Signal

Whoever heard of a frequency counter with an antenna? Yet, that's the first inside scoop on maximizing the capability to readout signals

directly from the air: the better the antenna, the more signal it will capture. Frequency counters typically require 1-10 millivolts for stable triggering, but signals in the air are more likely to be in the millions of a volt range. Don't expect much if you have a 4" piece of wire connected to the input of the counter! On the other hand, a 4" stub of wire might be ideal for detection of signals in the 800 MHz band!

One good, all-purpose antenna for portable frequency counting is Radio Shack's center-loaded telescoping whip, #20-006, which can be adjusted for maximum sensitivity over a wide range of frequencies, from 25 MHz to 1000 MHz, or more. Special purpose antennas can also be used with success, including log-periodics, TV antennas and other high-gain, directionals. A set of "rabbit ears" can even be pressed into service as a decent antenna for portable frequency counting.

Another useful item to have for difficult situations would be a wideband, high gain preamplifier of the type designed for scanners. When you're at the stadium trying to snag the security guard's handheld transmitter frequency and he's 100-ft away, you're not likely to have much luck and by the time you get close enough, he's likely to have finished his transmission. A preamplifier could prove very useful under such circumstances, but not just any preamp will do here. Generally speaking, it must be of the type designed for low-level signals and be as wideband with as much gain as possible. TV preamplifiers may be of some utility to successful frequency counting!

Next month, we'll dig deeper into the arts and sciences of frequency counting with emphasis on circuit measurements. One application in particular will be how to use your frequency counter as a digital readout for that old receiver with the analog tuning dial! Yes, it can be done!

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## Sources of Frequency Counters

Optoelectronics  
5821 NE 14th Avenue  
Ft. Lauderdale, FL 33334  
(800) 327-5912

DigiMax Instruments Corp.  
8560 Production Avenue  
San Diego, CA 92123  
(619) 578-7171

StarTek International, Inc.  
398 NE 38th Street  
Ft. Lauderdale, FL 33334  
(800) 638-8050

## Sources of Wideband Preamplifiers

Electronic Equipment Bank  
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Vienna, VA 22180  
(703) 938-3350

Electron Processing, Inc.  
PO Box 68  
Cedar, MI 49621  
(616) 228-7020

GRE America, Inc.  
425 Harbor Blvd  
Belmont, CA 94002  
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DELTACOMM™ I-7100 communication manager comes complete with Delta Research custom (CI-V) communication interface, UL listed power supply, manual and receiver interface cable for \$349.00 + \$8.00 (U.S.) or \$25.00 (foreign) S&H. Contact us for additional information on DELTACOMM™ communication managers for ICOM™ R7000, R71A, R72 and IC735. Performance is proportional to video card, type of computer and receiver squelch detection method.



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## Antenna Impedance, RDF, Reciprocity and More...

If you are the type that likes to set up a system for optimum performance, or design your own antennas, or perhaps you just like to understand the "why of it" when things don't turn out as expected, you may find an antenna bridge suits your needs.

### The MFJ-204B Antenna Bridge

By using the 204B as an indicator, you can adjust your antenna to resonate at its intended frequency of operation. This will increase the antenna's response to signals received at that frequency. (Often, however, due to the generally high noise level on the HF band, neither the signal-to-noise ratio nor reception is improved by this gain. The increase in signal strength so obtained can improve reception at frequencies in the upper portion of the HF band and higher, but only when the antenna is in an electrically quiet location where noise received by the antenna is less than receiver-generated noise.)

The MFJ-204B antenna bridge also enables you to measure an antenna's RF feed point impedance, up to as high as 500 ohms, covering all ham bands between 160 and 10 meters (1.8 to 30 MHz), and most of the spectrum in between. For reception on the lower portions of the HF band, matching feed point impedance to feedline impedance is not usually worthwhile. But it can improve reception on the higher frequency portion of the HF band (or higher) in electrically quiet locations.

Accurate antenna-to-feedline matching is usually not necessary in transmitting situations if good quality feedline is used. On the other hand, transmitter-to-feedline matching is quite important, and the 204B can help with this, too. The 204B can be used to measure the RF impedance of circuits such as a transmitter's output, an antenna tuner's input or output circuits, a receiver's input circuit, or home-built antenna matching circuits. It can also be used as an unmodulated RF signal generator.

This handy antenna bridge is available from MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762. The price in a recent catalog is \$79.95 plus \$6.00 UPS or \$7.00 first-class mail inside the USA. The 204B is battery operated, with an optional AC adaptor at \$12.95.

### When is an Antenna Book not an Antenna Book?

When it's a book on radio direction-finding (RDF), that's when. Any serious discussion of RDF will cover a lot of information on antennas because antennas and antenna utilization are the very heart of RDF. An excellent book on this subject is *Transmitter Hunting: Radio Direction Finding Simplified*, by Moell and Curlee (TAB BOOKS, Blue Ridge Summit, PA 17214).

Beginning with a brief history of RDF, a number of RDF techniques and a surprising variety of pieces of RDF hardware are covered in this book. Build-it-yourself information abounds for antennas as well as other RDF hardware accessories. Even if you don't plan to build any RDF hardware, you will likely find investing in this book to be time and money well-spent.

### A New Antenna Contest

We want to find which are the world's most unusual antennas: antennas that are quite differ-

ent from those which we ordinarily encounter in the field of radio communications. Differences can be in terms of appearance, type of construction, application (the job the antenna has to do), the unusual place where the antenna is located or whatever makes the antenna strange or unusual.

I'll consider all entries, decide which are the most unusual, and report them in a future "Antenna Topics" column. Winners will each receive a copy of an interesting and useful book on radio communications. So what is the most unusual antenna you have ever seen, read or heard of? Let me hear from you, write in care of *Monitoring Times*.

### World's Largest and Smallest Antennas?

Did you miss the results of our past contest to find the world's largest and smallest antennas? Just drop me a card at *Monitoring Times* to indicate your interest.

### Radio Riddles

#### Last Month

Last month we talked about how a rhombic beam antenna is basically bidirectional, but can be made unidirectional by the addition of a terminating resistor to one end of the antenna. Then we discussed the surprising fact that the addition of the terminating resistor apparently doubled the antenna's gain for receiving, but did not affect its gain for transmitting. The reciprocity rule says that an antenna will have the same gain for transmitting as it does for receiving, and so the question is whether the difference in apparent gain for receiving, as compared to transmitting, violates the well-known rule of antenna reciprocity.

The somewhat surprising answer to the above question is "no; reciprocity is present in this situation." The non-terminated rhombic was originally bidirectional and thus received normal atmospheric noise from two directions, but the desired signal was, of course, received from only one of those directions. When the terminating resistor was added, the antenna became unidirectional, in the direction of the desired signal (and the noise accompanying that signal), but noise from the non-desired direction (away from the direction of communication) was pre-



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GRE America is proud to introduce a new family of products to enhance your scanning pleasure! First, GRE has designed the new **Super Converter 9001** for base model scanners. The 9001 converts 810 MHz - 950 MHz down to 410 MHz - 550 MHz. The 9001 is the perfect alternative to buying a new, expensive scanner covering the 800 MHz band. Next, GRE announces the new **Super Amplifier 3001** for base model scanners. The 3001 will increase gain by as much as 20 dB, and is engineered to help scanners with low sensitivity pull in weak signals. Both products use BNC connectors, (1) 9 volt battery and have an off/pass switch for returning to normal operation.



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vented by the resistor from reaching the antenna feedline. That noise from the undesired direction never reached the receiver.

Thus the received noise competing with the desired, received signal was reduced to half its former value. Of course, the received signal was as strong as before the terminating resistor was added because it came from the direction which was unaffected by the addition of the resistor. Below about 20 to 30 MHz, the noise determining the signal-to-noise ratio in a receiver is primarily received noise (as opposed to noise generated in the receiver itself). Thus, halving the noise received from the antenna means that the signal-to-noise ratio at the receiver is essentially doubled in value and that reception is improved. Although the antenna's gain has not changed, the improved reception due to the reduction in received noise makes it appear that the antenna's gain has doubled.

With the resistor added, the amount of signal transmitted in the desired direction is the same as it was before the addition of the resistor. This is because, during transmission, the only portion of the signal that is absorbed by the resistor is that portion which would have been launched in the non-desired direction, away from

the station with which the rhombic is communicating.

Use of a terminating resistor prevents both radiation and reception in the undesired direction: this changes the received noise level and thus the quality of reception from the desired direction, but has no effect on the strength of the signal transmitted in the desired direction.

However, whether the antenna has the resistor added or not, its gain is the same for transmitting as it is for receiving: there is antenna reciprocity. It is the halving of the received noise by the addition of the resistor, and the fact that this halving increases apparent gain for reception, without an apparent gain for transmission, which makes this case interesting.

## This Month

Last December I asked: "Did you know that, for each location on earth, there is actually one other point on earth toward which your beam is always pointing, no matter what compass direction you choose to point it?" As pointed out in January's column, the usual answer to that question is that our beam always points toward a spot

directly opposite our location on the earth: a spot called the "antipode." But Paul Lalli, AA5AN, wrote to tell me that another spot toward which your beam is always pointed is your own location!

It's true; sufficiently strong signals beamed toward the horizon from your location will travel not only to the antipode, but, by the "round the world" great-circle path, they travel right back to your location again! And, if they are still strong enough, they may go on around again and even again until they are dispersed and dissipated by the media through which they travel.

You can check this out by running a straight line, such as a string, around a world globe in any direction from your location—it goes to the antipode and back to your own location again. And so, this month's riddle is: "Is it actually possible to transmit signals to yourself as described above, and if were possible, how long after you transmit would you have to wait to hear your own signal in your own receiver?"

We'll have the answer to this month's riddle in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

MT

**Q. Why don't scanner manufacturers put S meters on their radios like shortwave receiver manufacturers do? Jimmy Copeland, Point of No Return, AL)**

**A.** In the words of a long-running Broadway musical, "tradition"! For years I coaxed and cajoled the former Bearcat organization to do this, but to no avail. When you own virtually all basic scanner patents and have an 80% share of the market, you don't have to listen to anyone.

S meters can help listeners locate signals, prune antennas, choose feedline, determine distances to signals, assess propagation, determine signal polarization, and more. But they cost about \$3 in large quantities, so we won't expect to see them anytime soon. And don't bother to ask.

**Q. Is it possible to add an external device to a shortwave radio that will enable it to receive single sideband without modification? (Michael Oreskovic, Burlington, Ont.)**

**A.** Somehow the incoming SSB signal must mix with a steady, unmodulated signal which replaces the missing carrier wave in order for SSB to be demodulated intelligibly. This can be done either by injecting a signal from a signal generator at the antenna post or into one of the receiver's internal intermediate frequency (IF) circuits; usually the latter is done because the IF remains the same regardless of the signal's original tuned-in frequency.

I have tried generating a strong signal at the receiver's IF, placing a wire or radiating antenna device alongside the radio; sometimes it works and sometimes it doesn't. Much depends upon the strength of the incoming tuned signal, the shielding of the radio cabinet and the frequency of the IF.

In virtually every case, no external procedure is as dependable or effective as a built-in SSB circuit, usually called a product detector or beat frequency oscillator (BFO). A competent technician can add one to a receiver with reasonable difficulty, but it is usually better simply to replace the radio with one which was designed to receive SSB.

**Q. Where did the AA, C and D cell designators originate?**

**A.** In the early days of radio a variety of different voltages were required to operate vacuum tubes. These were given generic references: A (filament), B (plate), C (grid bias). D cells were used primarily in flashlights (and still are).

As time went on, the high voltages (67-90 volts) for plate circuits became a thing of the past, as did bias batteries, and the old single-letter designators took on new meanings. Still, all A designators (A, AA, AAA) are 1.5 volt cells, as are C and D cells.

New designators (N, V, W, sub-C, 175, etc.) have emerged to meet the infinitely variable demands of the consumer electronics industry.

**Q. How do I know when to set my shortwave reception mode to AM, narrowband FM (NFM), wideband FM (WFM), upper sideband (USB) or lower sideband (LSB)? John Stanton, Ripon, WI)**

**A.** Except for rare exceptions, the following rules of the radio road apply: All broadcasters between 160 kHz and 25 MHz use AM mode. Two-way communicators (maritime, aeronautical, government, military) use USB. Hams use USB above 10 MHz, LSB below. CBers use all three modes, but mostly AM.

Above 25 MHz some two-way NFM is heard, but WFM is confined to FM and TV broadcasters in the VHF/UHF spectrum.

**Q. Is there any way to tie the separate shortwave and VHF/UHF antenna inputs together on my ICOM R-100 so that I can use just one antenna? Can I simply bridge them together with a wire? (Kevin Chedville, Port Sulphur, LA)**

**A.** While bridging will work, I would recommend the use of a standard TV two-way splitter. Even though these are rated for VHF/UHF only, they work well down to the lower part of the shortwave spectrum.

Splitters isolate the two antenna jacks from interacting with each other; a simple bridge may allow the separate receiver sections to mutually interfere.

But there is still one problem: A shortwave antenna wire does not make a good VHF/UHF antenna, and a scanner antenna does not work well at HF. But if properly designed, you can combine two antennas designed for widely-separated frequency bands and feed them to the radio through one coax cable.

**Q. How can I choose a proper external speaker to add to my small portable radio? (Richard Dailey, Pittsburgh, PA)**

**A.** Any decent "hi-fi" add-on speaker, 4-16 ohms impedance, will improve the miserable sound quality of portable radios. Some portables like the Sony ICF-2010 have an internal resistor connected to the earphone jack that distorts the sound going into a speaker; this requires an amplified speaker so the receiver can be set at low volume, letting the external amplifier do the work.

If the amplifier has an input level (volume) control, you can adjust the balance to your liking, minimizing distortion, hiss and other noises resulting from too much gain.

The larger the speaker and the magnet, the better the sound quality and more efficient the power transfer. The best bet is to try a speaker with the understanding that you can bring it back to the store if it doesn't work well.

**Q. Does anyone publish a list of all broadcasting stations across the country by location? (Wes Goble, Winder, GA)**

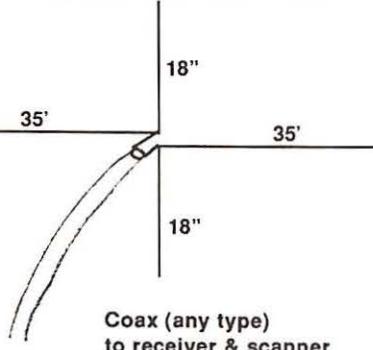
**A.** For FM, try Bruce Elving's *FM Atlas*, \$10.95 plus \$1.50 book rate shipping from Grove Enterprises, PO Box 98, Brasstown, NC 28902. For AM you can't beat the *AM Radio Log*, \$19.95 postpaid from the National Radio Club, Box 164-MT, Mannsville, NY 13661.

**Q. Will my scanner's internal parts gradually deteriorate in dry storage? (Bubba Copeland, Tuscaloosa, AL)**

**A.** Probably not; that's why imported electronic goods are frequently packaged with a packet of silica gel which absorbs moisture from overseas shipping.

While vacuum-tube radio restorers know to energize a long-stored radio by slowly bringing up the supply voltage to "re-form" electrolytic filter capacitors and check for short circuits, the significantly lower voltages found in modern solid state equipment should not pose a problem.

## Bob's Tip of the Month



### Build This Wideband Attic Antenna

Recently I had the urge to install a secondary receiving antenna system in the attic crawl space of my home. I desired a simple wire dipole which would cover shortwave and scanner frequencies, and it would be fed by only one coax line which was connected to the TV outlets throughout the house. It sounded like a tough assignment.

But I got to thinking about it. Receiving antennas are generally pretty forgiving; why not install the longest horizontal dipole I had room for, then add a VHF/UHF vertical dipole at the center feed point? After all, the two antennas should have little interaction since they are at right angles to each other. It worked!

The HF antenna is roughly 35 feet long and the vertical dipole measures 36 inches total length, allowing excellent 108-174 MHz high band and 406-512 MHz UHF coverage. If 30-50 MHz low band reception is critical, the upper element could be extended to about 54 inches (the lower element remains 18 inches). Experiment with various vertical lengths for best scanner reception.

All wire elements are simply tacked to the roof trusses every few feet for support, and the wires at the center may be soldered to a connector or directly to the coax.

Unique antenna designs are always fun and there is plenty of room for experimentation. How about sharing some of your discoveries with other *MT* readers?

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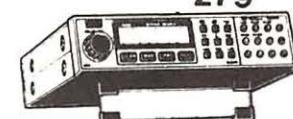
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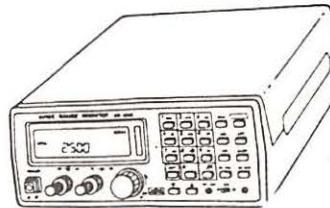
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BC-855XLT, 100 ch, 29-54, 108-174, 406-512, 806-956	225.00
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# Club Circuit

## Club Profiles

### MONIX (Cincinnati/Dayton Area Monitoring Exchange)

MONIX is an informal club of scanner enthusiasts and shortwave listeners that was founded in 1987. MONIX covers practically every area of the listening hobby. It meets at 7 p.m. on the 2nd Saturday of every month at the Voice of America Bethany Relay Station in West Chester (8070 Tylersville Rd; I-75 Exit 22).

MONIX maintains a BBS, and has built up an extensive database of VHF/UHF frequencies. The MONIX Shortwave Listener's Information Net meets every Thursday at 9:30 pm on 147.06/7.66 or 145.23/4.63 MHz (back-up repeater).

MONIX tries to maintain an active profile at all area hamfests, club meetings, and amateur activities. "It is just as important to monitor as it is to communicate, whether during emergencies or public service activities." MONIX tries to show other radio enthusiasts how important monitoring com-

munications can be, and always looks for ways to promote shortwave listening and scanning.

For more information, send an SASE to MONIX, c/o Mark Meece, 7917 Third St., West Chester, OH 45069-2212.

### NYC Radio Fre(ak)qs

This club was trying to get started just a year ago this spring, inspired by two people who felt the need for a local club with a focus on New York City scanning. Shortwave utilities are of interest also. The club was contemplating a future publication called "Ears of New York."

If you'd like to help build a club which would cover five boroughs, Long Island and surrounding towns, contact Joe Alverson, 199 Barnard Avenue, Staten Island, NY 10307.

### Southern Cross DX Club, Inc.

Southern Cross is Australia's full-spectrum DX club. It was founded in 1973, and has incorporated new targets and technology as they have

evolved through the ensuing years. Members come primarily from Australia, New Zealand and the South Pacific, but anyone is welcome.

Southern Cross meets in Adelaide at the Burley Griffin Building (34 W. Thebarton Rd., W. Thebarton) at 20.00 local time on the last Friday of each month. Meetings have an average attendance of 20 persons, and usually highlight a guest speaker.

In addition to its monthly magazine *DX Post*, Southern Cross also publishes a "Receiver Guide" and "Longwave Guide" plus a New Members Kit. DXpeditions give an opportunity for shortwave and mediumwave enthusiasts to hear low-powered and elusive stations.

Annual dues are \$A25 in Australia, \$A33 for Pacific islands, and \$A36 for USA, UK, Europe, etc. For more information write The Secretary, Southern Cross DX Club, GPO Box 1487, Adelaide SA 5001, Australia.

## Club Listings A - L

**All Ohio Scanner Club:** Dave Marshall, 50 Villa Rd., Springfield, OH 45503-1036. Ohio and surrounding states; VHF/UHF and some HF and amateur coverage. *American Scannergram*.

**American SW Listener's Club:** Stewart MacKenzie, WDX6AA, 16182 Ballad Lane, Huntington Beach, CA 92649, (714) 846-1685. Western US, Pacific, Asia, & Middle East; SWBC, utilities, longwave. *SWL*.

**Association of Clandestine Enthusiasts (A.C.E.):** Kirk Baxter, P.O. Box 11201, Shawnee Mission, KS 66207. US, Europe and Middle East; Pirate and clandestine. *The A.C.E.*

**Association of DX Reporters (ADXR):** Reuben Dagold, 7008 Plymouth Rd. Baltimore, MD 21208. International; Utilities, ham band, QSLing, MW, LW, and SWBC. *DX Reporter*.

**Association of Manitoba DX'ers (AMANDX):** Shawn Axelrod, 30 Becontree Bay, Winnipeg, Manitoba, R2N 2X9 Canada, (204) 253-8644. Manitoba; LW, MW, SW, and VHF/UHF

**Bay Area Scanner Enthusiasts:** Herman Frisch, 4718 Meridian Ave. #265, San Jose, CA 95118. San Francisco Bay area; 30+ MHz. *Listening Post*

**Bayonne Emergency Radio Network (BERN):** Ray Baron, P.O. Box 1203, Bayonne,

NJ 07002, 201-662-2222. NE Jersey; Fire/disaster.

**Bearcat Radio Club:** Larry Miller, Box 360, Wagontown, PA 19376, 1-800-423-1331. US and Canada; Scanning only. *National Scanning Report*.

**Boston Area DXers:** Paul Graveline, 9 Stirling St., Andover, MA 01810, (508) 470-1971, 50 mile radius Boston; SWBC.

**Canadian Int'l DX Club:** Sheldon Harvey, President, 79 Kipps St., Greenfield Pk., Quebec, Canada J4V 3B1, (514)462-1459. Canada nationwide/membership open to all; General coverage. *The Messenger*

**Chicago Area DX Club:** Edward G. Stroh, 53 Arrowhead Dr., Thornton, IL 60476. 150 mile radius of Chicago; Dxing all bands. *DX Chicago*.

**Cincinnati Area Monitoring Exchange (MONIX):** Mark Meece, 7917 Third St., West Chester, OH 45069-2212. SE Indiana, Kentucky, SW Ohio; SWBC, utility, military, satellites, scanning, BCB.

**DecalcoMania:** Paul Richards, P.O. Box 126, Lincroft, NJ 07738, (206) 356-3927 (Phil). Collecting radio related items.

**Drake SPR4 Int'l Club:** Rick Sitz, 5210 14th St. W. #11, Bradenton, FL 34207. Worldwide; Drake SPR4 owners.

**DX Audio Service (NRC):** NRC Publications Center, P.O. Box 164, Mannsville, NY 13661-0164.

Worldwide; AM/FM; DXAS Cassette 90-min monthly audio magazine. Sample \$3 to above address

**DX Club of India:** Navin Patel, 809, M.G. Road, 1-Dutt Niwas, Mulund, Bombay-400 080, India. India; SW DXing.

**European DX Council:** Michael Murray, P.O. Box 4, St. Ives, Huntingdon, Cambs PE17 4FE, England. Europe. *Euro DX*.

**Houston Area Scanners & Monitoring Club:** 909 Michael, Alvin, TX 77511, (713) 388-1941. 75 mile radius of Houston, TX; scanning & SW.

**Int'l Radio Club of America (IRCA):** Ralph Sancserino, P.O. Box 70223, Riverside, CA 92503. Worldwide; BCB/AM DX. *DX Monitor*.

**Longwave Club of America:** Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215)945-0543. Worldwide; Longwave only. *The Lowdown*.

### New Additions:

**World DX Club:** Arthur Ward, 17 Motspur Drive, Northampton, England NN2 6LY (in USA-Richard D'Angelo, 2216 Burkey Drive, Wyomissing, PA 19610). United Kingdom and worldwide. SW, MW broadcasting DX, FM & TV DX, amateur radio. *Contact*.

## SPECIAL EVENT CALENDAR

Date	Location	Club/Contact Person
Mar 6	Absecon, NJ	Shore Points ARC/SPARC, P.O. Box 142, Absecon, NJ 08201 Location: Holy Spirit HS, Route 9, approx 1/2-mile so of Route 30. Doors open 9 am. \$4 admission. Talk-in on 146.385/985.
Mar 6	San Benito, TX	San Benito ARC & S.T.A.R./Fred "Al" Wasielewski, WA2VJL RR8 Box 20-B, San Benito, TX 78586.
Mar 7	Northampton, MA	Mt. Tom Amateur Repeater Assoc/Marvin Yale 6 Laurel Terrace, Westfield, MA 01085.
Mar 13	Scottsdale, AZ	Scottsdale ARC/Allen Sklar, AA7BJ P.O. Box 10095, Scottsdale, AZ 85271.
Mar 13	Flemington, NJ	Flemington Hamfest/Cherryville Repeater Association II, Keith Burt, KF5FK P.O. Box 308, Quakertown, NJ 08868-0308; 908-788-4080. Location: Hunterdon Central HS Field House, 1 mile no of the Route 202-31 traffic circle. \$5 admission, talk-in on 147.375.
Mar 13-14	Orlando, FL	No Florida Section ARRL Convention/John Lenkerd, W4DNU 1046 Turner Rd., Winter Park, FL 32789.
Mar 13-14	Charlotte, NC	1993 Charlotte Hamfest/ARRL, W. Reed Whitten, AB4W 1208 Oxford Place, Cary, NC 27511. Location: Charlotte Merchandise Mart, 2500 E. Independence Blvd, Liberty Hall. Sat 9 am to 5 pm; Sun 9 am to 2 pm; \$8 admission.
Mar 14	Conneaut, OH	Conneaut ARC/Allan Keskinen, 866 Sandusky St., Conneaut, OH 44030.
Mar 21	Yonkers, NY	WECAFEST '93/Westchester Emergency Comm Assoc, Sarah Wilson, N2EYX P.O. Box 831, North Tarrytown, NY 10591-0831. Location: Yonkers Raceway, 9 am-2 pm, \$5 admission. Talk-in on 147.060.
Mar 21	Maumee, OH	Toledo Mobile Radio Assoc/Chuck Krukowski, KB8FXJ 9408 Salisbury, Monclova, OH 43542.
Mar 28	Zanesville, OH	Zanesville ARC/Glenn Ridgley, KE8YP 340 Mead St., Zanesville, OH 43701.
Apr 2-3	No Little Rock, AR	Arkansas State Convention/James Warlick, AA5ZI 8807 Willhite Rd., No Little Rock, AR 72116.
Apr 3	Virginia Beach, VA	Chesapeake ARS/Preston Ipock, N4SHI 1026 Calloway Ave., Chesapeake, VA 23324.
Apr 3	Perry, GA	Georgia State Convention/Donald Hoover, KD4FAP 1412-A Russell Pkwy, Suite 210, Warner Robins, GA 31088.
Apr 3-4	Spokane, WA	Spokane ARC/Ivan Brown, KF7PU E537 Nebraska, Spokane, WA 99207.
Apr 4	Southington, CT	Southington ARA Flea Market/P.O. Box 873, Southington, CT 06489. Location: Southington HS, 9 am to 1 pm, \$10 admission, talk-in on 146.28/88.
Apr 4	Raleigh, NC	Raleigh ARC/Chuck Littlewood, K4HF 2005 Quail Ridge Rd., Raleigh, NC 27609.
Apr 4	Grosse Pointe Woods, MI	SE Michigan ARA/John Mears, N8IPJ 1732 Anita, Grosse Pointe Woods, MI 48236.
Apr 10	Clinton, TN	Oak Ridge Hamfest/Oak Ridge ARC, Ray Adams, N4BAQ 4325 Felty Drive, Knoxville, TN 37918. Location: National Guard Armory, 8 am to 5 pm. \$4 admission, talk-in on 146.88.
Apr 16-19	Visalia, CA	No California DX Convention/James Knochenhauer, K6ITL 133 Sylvan Ave., San Mateo, CA 94403.
Apr 18	Rockford, IL	Rockford ARC/Joseph Roling, N8HEZ 5850 Strathmoo Dr., Rockford, IL 61007.
Apr 17	Bowling Green, KY	Kentucky Colonels ARC Hamfest/Jim Honaker, N4WKJ P.O. Box 9781, Bowling Green, KY 42102. Location: National Guard Armory on Hwy 231, 7 am to 2 pm, \$4 admission. Talk-in on 146.25/85 repeater.
Apr 23-25	Dayton, OH	Dayton Hamvention/Bill Schmid, WD8LOI PO Box 964, Dayton, OH 45401.

Monitoring Times is happy to run brief announcements of radio events open to our readers. Send your announcements at least 60 days before the event to:

Monitoring Times Special Event Calendar, P.O. Box 98, Brasstown, NC 28902-0098

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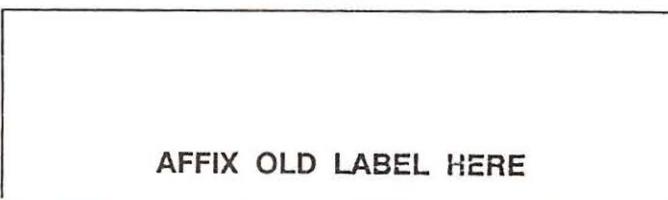


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Interested in contacting fellow scanner buffs in the Bryan/College Station, Texas, area to share frequencies and other various scanner information. Also possible starting some type of scanner club for the area. Please contact S. Kapchinski, P.O. Box 11132, College Station, TX 77842.

AOR AR1000, \$300 or trade for unmodified PRO-43. Bearcat 100XL 16 channel programmable handheld, includes aviation, \$80. Gary 313-381-1293.

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## DX RADIO TESTS

The International Radio Club of America (IRCA), is a club devoted to the hobby of hearing distant stations on the standard AM broadcast band. For more information, or a sample issue of DX Monitor, write to: The International Radio Club of America (IRCA), 11300 Magnolia #43, Riverside, CA 92505, USA. Please enclose 1 U.S. dollar or 3 IRCs if you are requesting a sample issue.

These tests were arranged by J.D. Stephens for IRCA.

**Monday, March 1, 1993: WWJZ-640**, P.O. Box 81, Mount Holly, NJ 08060, will conduct a DX test from 12:00-1:00 am EST. The test will include Morse code, tones and voice ID's. During the test, they will be switching between omnidirectional and directional antenna patterns, as well as powers of 10 kW and 50 kW. There is a possibility that the test may run longer. Reception reports may be sent to: Mr. Mike Mathieu, Chief Engineer.

**Monday, March 1, 1993: KGWA-960**, P.O. Box 960, Enid, OK 73702, will conduct a DX test from 3:00-4:00 am EST. The test will include Morse code, tones, voice ID's and march music. Reception reports may be sent to: Mr. Scott Clark, WA7UIB, Chief Engineer.

**Monday, March 8, 1993: KPCR-1530**, P.O. Box 1, Bowling Green, MO 63334, will conduct a DX test from 1:00-3:00 am EST. The test will include Morse code and various programming. Reception reports may be sent to: Mr. J. Paul Salois, General Manager.

**Tuesday, March 9, 1993: KTNS-1090**, 40356 Oak Park Way, Oakhurst, CA 93644, will conduct a DX test from 3:00-4:00 am EST. The test will include Morse code and an unspecified selection of music. Reception reports may be sent to: Mr. Larry Gamble, General Manager.

**Monday, March 15, 1993: KKAR-1580**, 1001 Farnham-on-the-mall, Omaha, NE 68102, will conduct a DX test for a 15 minute period between 1:00 and 1:30 am EST. The test will include Morse code and possibly march music. Reception reports may be sent to: Mr. Allen Sherrill, Chief Engineer.

**Monday, March 15, 1993: KWKY-1150**, P.O. Box 662, Des Moines, IA 50303, will conduct a DX test from 1:00-1:30 am EST. The test will include Morse Code, tones, voice ID's and march music. Reception reports may be sent to: Mr. Howard Kling, Chief Engineer.

**Wednesday, March 24, 1993: WSMI-1540**, P.O. Box 10, Litchfield, IL 62056, will conduct a DX test between 1:00 and 1:10 am EST. The test will include Morse code, tones and voice ID's and will be part of the station's monthly frequency check. Reception reports may be sent to: Mr. Brian Talley, N9OWV, Chief Engineer. Mr. Talley requests an SASE by included with all reports.

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## Anti-Cellular Scanners and the FCC

In compliance with the Telephone Disclosure and Dispute Resolution Act (Pub. L. 102-556), after April 26, 1993, the Federal Communications Commission will no longer certify scanners which cover, or can be readily altered to cover, the 824-849 and 869-894 MHz cellular telephone frequencies. After October 24, 1993, no such scanner can be legally manufactured in or imported into the United States.

The FCC's January 13th Notice of Proposed Rulemaking required public comments to be submitted by February 22, a period so short that leading monthly magazines could not alert their readers—or even the manufacturing industry—in time to respond to the NPRM.

So what constitutes a "readily alterable" scanner? According to the FCC, "cutting, or adding, a simple component such as a resistor, diode or jumper wire (or by) unplugging a semiconductor chip and/or plugging in a new one."

But what if one cuts or adds two wires or components? Or unplugs a chip and leaves it out?

The FCC apparently seeks to avoid confronting these issues by requiring all manufacturers to submit affidavits stating that their equipment cannot be used to listen to cellular transmissions. But shifting the burden of compliance to the manufacturer is meaningless since the owner may do whatever he wishes with his scanner.

The FCC has overstepped its authority, however, by addressing converters; these are not even mentioned in the Congressional directive to which the Commission is ostensibly responding. The FCC ruling prohibits frequency converters that cover the cellular frequencies. Somebody at the Commission doesn't know much about electronics.



It is impossible to design a practical converter for monitoring 800 MHz police, fire, amateur and other communications that skips cellular. The proposed ruling bans all 800 MHz converters.

Wouldn't it make more sense simply to require that all 800 MHz converters carry a warning label stating that monitoring cellular telephone conversations is unlawful?

Most troubling of all is that the FCC would prohibit scanners which can be "equipped with decoders that convert digital cellular transmissions to analog voice audio." Since such a device could be conceivably added to *any* scanner, this rule technically eliminates all scanners, scanning ham transceivers and even commercial two-way radios with channel scanning.

The proposed law does not prohibit kits which can be added to restore cellular coverage, continued use of pre-prohibition cellular-capable scanners, image reception of cellular frequencies on future cellular-censored scanners, converter kits to receive cellular, scanner kits to receive cellular, tunable receivers which can include cellular coverage, or even test receivers which include cellular scanning.

Scrambling will shortly render scanners useless on cellular frequencies even without the new regulations, but if enacted, the communications industry will be throttled by these ill-conceived prohibitions from now on.

Bob Grove  
Publisher

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